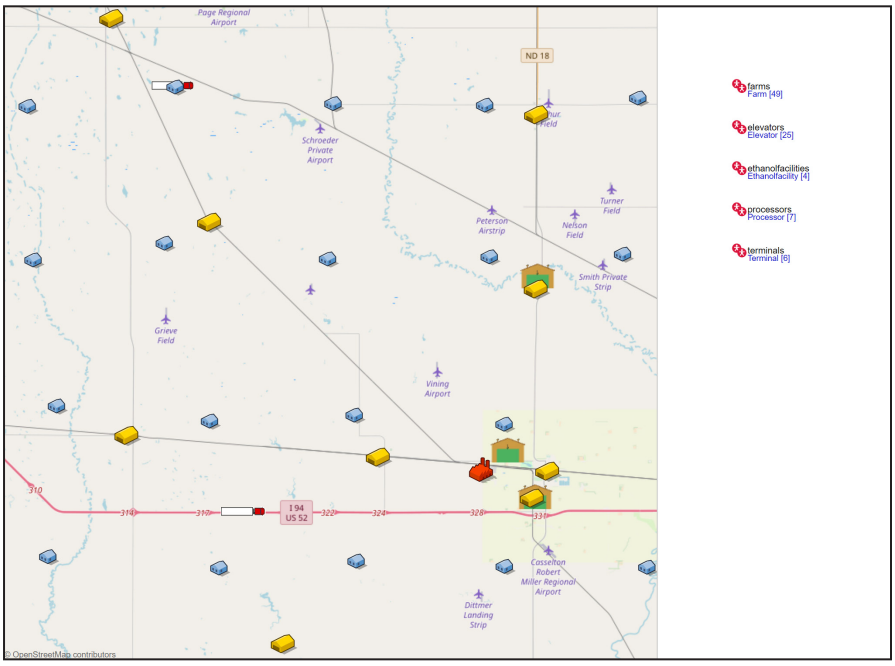
MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 18-370 (project 458) | November 2018

Application of a Multi-Agent System with the Large-Scale Agent-Based Model for Freight Demand Modeling



the **ISSUE**

North Dakota road and bridge infrastructure is critical to support energy development and the agricultural industry. Due to the nature of infrastructure investment, transportation planning requires long-term projection and large investments of public dollars. consequently, statewide freight demand modeling is a great tool for planning enhancing effective and efficient investment.

the **RESEARCH**

In this study, researchers used the agent-based simulation (ABS) for modeling agricultural transportation demand. With the simulation model, geographic information systems (GIS) was utilized to collect and analyze remote sensing of agricultural crops. The researchers reviewed agent-based modeling in freight and public transportation planning to fill the gap between traditional modeling efforts and emerging needs of adopting behavioral modeling for an agricultural transportation model. The study then investigated adoption of an agent-based model for a large-scale travel demand model. The objective of the proposed model was to provide a platform to analyze grain transportation movement at the micro-level, since most industry reports lack such micro-level freight analysis while supporting regional and statewide planning.

MOUNTAIN-PLAINS CONSORTIUM REGION 8

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

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North Dakota State University
South Dakota State University
University of Colorado Denver
University of Denver
University of Utah
Utah State University
University of Wyoming

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Project Title

Application of a Multi-Agent System with the Large-Scale Agent-Based Model for Freight Demand Modeling

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the **FINDINGS**

Researchers found that the proposed model is capable of handling sophisticated decision-making processes, such as grain pricing strategies, transportation costs, holding costs, and advanced logistics choice model and the behavioral selection process.

the **IMPACT**

Agent-based simulation for modeling agricultural transportation demand provides a greater level of detail for transportation planning efforts. This level of detail increases accuracy and enhances the ability to accurately project investment needs and target infrastructure investments.

For more information on this project, download the entire report at http://www.ugpti.org/resources/reports/details.php?id=926

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.

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