



### Research Problem Statement

RESEARCH PROGRAMS USE ONLY	
RESEARCH IDEA NO:	25-011
DATE OF RECEIPT:	06/04/2024
TOTAL MDT COST WITH IDC:	

**Title:** Assessing The Impacts and Challenges of Truck Platooning on Highway Infrastructure in Montana

Yes  No **Are you an MDT Employee?**

**Name:** Sherif Moustafa Gaweesh

**Affiliation:** Assis. Prof. - University of North Dakota

**Phone Number:** +1 (707) 777-5058

**Email:** sherif.gaweesh@und.edu

Yes  No A research idea must have an MDT employee as its' champion.  
Have you contacted an MDT employee regarding your research idea?

**MDT Contact:** Jason Hughey

**1. Problem Statement: What issue or situation are you trying to solve?**

The Montana State Legislature is anticipated to introduce legislation regarding the use and regulation of truck platooning in Montana during the next legislative session in 2025. MDT Planning Division expects to be requested by the State Legislature to provide expert guidance on how the emerging technology of truck platooning will impact transportation infrastructure and systems in Montana.

The rapid evolution of transportation technologies, including the emergence of truck platoons, across infrastructure, vehicles, and systems, indicates a future characterized by intelligent infrastructure, interconnected vehicles, and autonomous driving. Projections indicate a gradual yet significant adoption of automated driving systems, with forecasts suggesting that by 2050, autonomous vehicles and advanced transportation technologies could represent 50% of the US vehicle fleet.

While implementing truck platooning provides several potential advantages benefiting surface transportation, the trucking industry, and overall economic growth, it also introduces a host of new challenges for MDT to navigate. These challenges primarily revolve around the uncertainty regarding how truck platooning will impact existing highway infrastructure and the traveling public.

Consequently, this research project will proactively prepare MDT for this emerging technology by identifying the needs for efficient testing and deployment of truck platoons, and evaluating the anticipated challenges associated with its implementation.

**Note: All research ideas submitted become public property and submitters are not guaranteed to receive a contract for any work that may result from this research idea.**



## Research Problem Statement

### 2. Research Proposed: What work will be completed and accomplished to address the problem?

This research project will help prepare MDT for the legislative session by identifying the requirements and limitations associated with operating truck platoons along with a thorough examination of the multifaceted impacts.

The objectives of this research project include reviewing the current state-of-the-practice regarding national, state, and local regulatory frameworks and legislation pertaining to truck platooning. This analysis will serve to pinpoint infrastructure, traffic management policy, roadway design, and standardization needs essential for facilitating the deployment of truck platooning.

The research objectives will identify how truck platoons could impact the operation and safety of the highway system. The goal of this research is to provide practical guidance for MDT decision-makers to respond to the State Legislature regarding inquiries on how truck platooning could impact Montana highways and the traveling public.

### 3. Background: What led you to this topic? Provide sufficient background in non-technical language (no jargon) to help reviewers understand your thoughts behind the issue or statement (problem).

The trucking industry stands at the forefront of testing and implementing automation technologies, including truck platooning. Over the last few years MDT has had several inquiries, including from the State Legislature, regarding our policies and procedures for truck platoons operating in the state. Since Montana currently does not have any guidelines for truck platooning in the state, it is important that MDT identify the limitations and challenges that need to be addressed before this technology is implemented in Montana. Keeping in mind the unique nature of Montana with mountains and plains, with adverse weather conditions, rural settings, and challenging roadway geometry, testing and deploying such technologies might be even more complicated than in other states. This raised the need to proactively assess and evaluate the impacts and challenges of truck platooning on highway infrastructure in Montana.

### 4. Expected benefits to MDT: What benefits do you anticipate this project would offer? How would results be used within MDT (District and Divisions)?

This research will:

- 1) Provide recommendations about Montana Truck platooning regulations and legislations
- 2) Identify highway infrastructure, roadway design, and traffic control devices needs to facilitate operation of truck platoons
- 3) Collect expert perception of deploying truck platoons on Montana highway system.

This will help MDT to embrace the era of CAV technologies, while having a proactive perspective on truck platoons. The benefits of this proposal will include

- 1) Improved Infrastructure Planning
- 2) Efficient Resource Allocation
- 3) Enhanced Safety Measures
- 4) Improved Operational Strategies

Yes  No **Has the problem statement been vetted through initial review by the Research Section, which includes a literature review completed by the MDT Librarian?**

### 5. Research Objectives: Identify the outcome of the research. Basic listing of deliverables or sets of deliverables. *This should be a basic list of what is "likely" to be required as a part of this research. This does not have to be detailed but will help any reviewers and proposal responders understand your thoughts behind the problem. We don't want to tell them how do to the research but we want to state what the objectives are.*

The research aims to provide comprehensive insights into the impacts and challenges of truck platooning on highway infrastructure in Montana. The outcomes of this research are to help in providing practical guidelines for MDT decision-makers, aiding in the formulation of a strategic plan for the implementation of truck platooning activities in Montana. The key deliverables would include:

1. Comprehensive Final Report

**Note: All research ideas submitted become public property and submitters are not guaranteed to receive a contract for any work that may result from this research idea.**



### Research Problem Statement

2. Legislative and Regulatory Review  
 3. Infrastructure and Roadway Design Needs Assessment  
 4. Analysis of expert and public perceptions on deploying truck platoons in Montana.  
 5. Research manuscripts to support practitioners' understanding and implementation of findings.  
 6. A detailed PowerPoint presentation summarizing the research findings for MDT stakeholders.  
 7. Quarterly Progress Reports  
 These deliverables will ensure that the MDT is well-prepared to integrate truck platooning technologies into Montana's transportation system, addressing both the benefits and challenges.

**6. Deliverables and Products: What tools and outcomes would help MDT implement the results or findings of the research?** How would you expect results to be used by MDT. Include work units within the Agency that would need to implement (use) the results. Examples of products are: specifications, manuals, processes, tools, training courses, additional resources needed, models, or updated designs.

Below are the expected uses of the proposal results by MDT:  
 Policy Development: Informing state legislation and regulatory frameworks to support truck platooning.  
 Infrastructure Planning: supporting infrastructure planning and modifications to accommodate truck platooning.  
 Safety Enhancements: Providing suggestions to ensure the safe integration of truck platoons into the existing traffic system.  
 Public Engagement: Educating and engaging the public to promote acceptance and understanding of truck platooning technologies.

**7. IT Component: Most research projects produce and/or use data. If you think this idea would use or create data, the project has an IT component.**

Yes  No Does this idea have an IT Component?

**8. Cost Estimate - include assumptions and timeline to support the estimate.**

The project is anticipated to span over a time frame of 12 months with a budget of \$86K including indirect cost rate of 41% calculated based on UND's indirect cost rate.

**9. Sponsor. Your division administrator will become the sponsor of this idea. Please state what Division you are in and who is the Division Administrator.**

Rob Stapley, Planning Division Administrator

**10. Additional Information: What else would you like to share to elevate the importance of your problem statement?** *Include any additional information you think is relevant to the proposal. Key information could include units and personnel that were consulted during the development of the research idea, or any additional business units that would be beneficial to implementation.*

This proposal assesses the significance of truck platooning in Montana. It aims to position the Montana Department of Transportation (MDT) at the forefront of preparing for the testing and deployment of truck platooning by identifying its benefits and challenges. Key benefits of truck platooning include:  
 Economic Impact: Truck platooning can significantly reduce fuel consumption and operational costs for freight companies, contributing to economic growth and competitiveness.  
 Environmental Benefits: By reducing fuel consumption and emissions, truck platooning contributes to environmental preservation.  
 Safety Enhancements: Advanced Driving Assisting Systems (ADAS) and Automated Driving Systems (ADS) used in truck platooning can improve road safety by reducing human error, which is a leading cause of traffic accidents.  
 Technological Leadership: Embracing truck platooning positions Montana as a leader in transportation innovation, attracting

**Note: All research ideas submitted become public property and submitters are not guaranteed to receive a contract for any work that may result from this research idea.**



## Research Problem Statement

technology investments and expertise to the state.

Future-Readiness: Preparing for truck platooning aligns with the broader trend towards automation and smart infrastructure, ensuring that Montana's transportation system remains competitive and future-ready.

**Note: All research ideas submitted become public property and submitters are not guaranteed to receive a contract for any work that may result from this research idea.**