Research Stage 1 Problem Statement

PROPOSED TITLE: Enhancing Commercial Motor Vehicle Safety and Compliance: Evaluating the ARIES Pilot and Illegal Bypass Behavior in Oregon

1. Concisely describe the transportation issue (including problems, improvements, or untested solutions) that Oregon needs to research.

Illegal bypasses of weigh stations and roadside enforcement sites pose a growing challenge to Oregon's commercial vehicle safety and compliance efforts. These bypasses allow high-risk vehicles and drivers to evade inspection, undermining roadway safety and regulatory enforcement. ODOT's Commerce and Compliance Division (CCD) currently lacks a standardized data methodology to quantify the scope of the problem or link bypass behavior to safety outcomes. Without this information, enforcement resources cannot be efficiently allocated, and Oregon risks missing opportunities for federal funding to modernize its enforcement technologies. Research is needed to understand how other states address illegal bypasses and to develop a data-driven framework that supports statewide implementation and future **FMCSA Innovative Technology Deployment (ITD)** grant applications.

2. What final product or information needs to be produced to enable this research to be implemented?

This research will produce a comprehensive framework that enables ODOT's Commerce and Compliance Division (CCD) to better detect, analyze, and prevent illegal bypasses at weigh stations and roadside enforcement sites. Beginning in Summer 2026, CCD will launch the **Automated Roadside Information and Enforcement System (ARIES)** pilot project at the Bend, Oregon, Weigh Station, which will serve as the foundation for data collection to support this research effort. The ARIES project aims to reduce illegal bypass non-compliance by deploying automated enforcement camera systems at ODOT's 21 weigh-in-motion (WIM) sites, enhancing compliance monitoring and enforcement efficiency as part of Oregon's broader ITD strategy. The final research products will include a detailed assessment of national best practices, a data integration methodology linking bypass events with driver and vehicle safety outcomes, and a set of performance measures to evaluate enforcement effectiveness. These outputs will inform updates to CCD's enforcement procedures, specifically regarding the expansion of automated enforcement, data management protocols, and operational guidelines, as well as policy decisions concerning cross-state data sharing. Additionally, this work will aim to validate the correlation between the severity of penalties and compliance. Together, the research and ARIES deployment will provide the analytical foundation needed to support Oregon's FMCSA Innovative Technology Deployment (ITD) Grant applications and guide the statewide expansion of automated bypass detection technologies.

3. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

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4. Other comments:

The proposed research will directly complement CCD's upcoming **Automated Roadside Information and Enforcement System (ARIES)** initiative, which will begin pilot deployment in Summer 2026. ARIES represents a key step in Oregon's broader FMCSA Innovative Technology Deployment (ITD) strategy, focusing on automated violation detection, compliance monitoring, and enhanced roadside enforcement at 21 weigh-in-motion (WIM) sites statewide. As this system comes online, it will generate new streams of enforcement and compliance data that have not previously been available for research. **In addition, the study will incorporate truck telematics data to provide complementary behavioral insights such as speed, route deviation, and braking activity associated with bypass events and driver risk patterns.** This study will leverage those data to identify trends in illegal bypass behavior, evaluate safety and compliance impacts, and develop a methodology that informs both enforcement strategy and future technology investment.

The research will be structured around several core tasks: (1) conducting a literature review and national scan of illegal bypass enforcement practices; (2) compiling and integrating CCD enforcement, inspection, and crash data with new ARIES pilot data; (3) performing analytical assessments to identify relationships between bypass behavior, violation types, and safety outcomes; and (4) developing performance measures to support decision-making and future **FMCSA ITD grant applications**. Deliverables will include a comprehensive report, data integration framework, and recommended performance metrics to guide long-term monitoring and evaluation of ARIES effectiveness.

This project aligns closely with ODOT's goals to improve freight mobility and safety through technology-driven enforcement and data-informed decision-making. By establishing a repeatable and transparent data methodology, ODOT will be better positioned to justify and expand future federal ITD funding, refine enforcement priorities, and strengthen partnerships with other states pursuing similar compliance modernization efforts. The results of this study will provide both immediate operational benefits and long-term strategic value as Oregon advances toward a fully automated, data-integrated enforcement system.

5. State of Oregon Decision Making Lenses

State decision making lenses are a part of the state of Oregon's policy structure. State policy and federal policy are not always aligned. The state will prioritize research according to state policy, however ODOT may be required to skip prioritized proposals based on constraints placed on the use of federal funds. If state funds are available ODOT will attempt to fund prioritized research that is deemed ineligible for federal funding.

Please complete the following three sections. Your answers to these questions will be applied on a programmatic basis to support agency decisions. Answering yes to the questions below is not required. Resolving a narrowly focused technical research problem may meet agency needs without answering yes to any of the following questions. The ODOT Research Section will seek a balanced portfolio some

projects will answer yes to one of the three categories below (e.g. climate, equity, and/ or safety) and other projects in a different category.

We are looking for an overall program balance and no one project is expected to balance all categories. Generally, a research problem statement is expected to be able to answer yes with clear and verifiable information in only one of the three categories below, some projects may be able to answer yes in two or even three categories. Some projects (i.e. needs focused on specific elements of infrastructure design), may have no 'yes' answers but may still be a high value research need.

Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. To that end, we seek research that reduces carbon emissions from construction activities and materials, and from maintenance equipment and operations. Oregon envisions a transportation system that is resilient, this means a system that is durable in the face of seismic events and extreme weather to avoid negative impacts, withstand them or bounce back quickly to resume system function. We seek research that improves the ability of the transportation system to adapt or cope with more frequent and extreme weather events. This may include innovations in data and data sharing, construction materials and project design, communication, emergency planning and response, and more. Similarly, we seek research that avoids negative impacts on key habitats and ecosystems that can buffer or reduce damage to infrastructure and improve environmental conditions for wildlife and native vegetation. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

5a. Will addressing the transportation issue identified as a need in Question 1 develop, or **validate methods for the estimation, measurement, or monitoring** of transportation generated greenhouse gases (GHG)?

☐Yes ☒No ☐Unsure

5b. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

☐Yes ☒No ☐Unsure

5c. Will addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

☐Yes ☒No ☐Unsure

5d. Will solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

☐Yes ☒No ☐Unsure

5e. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, or monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☒Yes ☐No ☐Unsure

5f. Will solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation?

☐Yes ☒No ☐Unsure

5g. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

> While climate and greenhouse gas (GHG) reduction are not the primary focus of this project, the proposed research will indirectly support **transportation system resilience** through modernization of enforcement infrastructure and data systems. The integration of **ARIES** roadside technology and **telematics** data promotes digital rather than physical inspection processes, reducing the need for enforcement vehicle travel and onsite staffing, which can contribute modestly to lower operational emissions.
>
> More importantly, the project supports **resilience objectives** by strengthening Oregon's ability to maintain freight operations during adverse weather or natural events. By ensuring that high-risk or non-compliant vehicles are detected and addressed proactively, ODOT enhances the reliability and safety of critical freight corridors even under extreme conditions. This data-driven approach aligns with Oregon's Strategic Action Plan goals of building a transportation system that can **withstand and recover quickly from climate-related disruptions** through innovative technology and adaptive management.

Equity

Equity can have many dimensions and impacts relating to communities and transportation. It is important that problem statement proposals clearly explain the equity dimensions or impacts being examined. Oregon commits to social equity in the OTP, specifically to *improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust*. We seek research that studies elements of this goal or applies analysis to specific transportation topics to ensure the resulting research recommendation is consistent with agency equity goals. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

5h. Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☐Yes ☒No ☐Unsure

5i. If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

☒Yes ☐No ☐Unsure

5j. Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

☒Yes ☐No ☐Unsure

5k. Is the intended final product or information expected to support ODOT's equity efforts (Including but not limited to supporting one of the equity related objectives of the ODOT's Strategic Action Plan or Oregon Transportation Plan) ?

☒Yes ☐No ☐Unsure

5l. If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

Although equity is not the primary research focus, this project aligns with ODOT's **equity and access goals** by improving the fairness and transparency of commercial vehicle enforcement statewide. By standardizing detection and enforcement through ARIES and data-driven analytics, CCD can ensure consistent treatment of carriers regardless of geography, size, or demographic factors, helping to prevent arbitrary or uneven enforcement outcomes.

Additionally, equitable access to safe, well-maintained freight corridors benefits Oregon communities, particularly those along major freight routes that may experience higher exposure to safety and emissions risks from non-compliant vehicles. The project's emphasis on open data frameworks and transparent performance measures also supports ODOT's Strategic Action Plan goal to create **equitable and transparent decision-making structures** that foster public trust and accountability.

Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan, Oregon Transportation Safety Action Plan and Oregon Transportation Plan.

5m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☒Yes ☐No ☐Unsure

5n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☒Yes ☐No ☐Unsure

5o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☒Yes ☐No ☐Unsure

5p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☒Yes ☐No ☐Unsure

5q. Will solving the **transportation issue** support improving safety through **investing strategically**? 5r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

Safety is the **central focus** of this research. The project directly supports ODOT's mission to reduce roadway risk by preventing unsafe commercial vehicles and drivers from bypassing inspection and enforcement. Through the ARIES system and integration of telematics data, CCD will gain new tools to identify high-risk behavior in real time, enabling more targeted enforcement and improving overall compliance.

This research advances ODOT's **safety culture** by promoting data-driven decision-making, cross-agency collaboration, and the use of advanced technologies to anticipate and mitigate safety risks before crashes occur. By optimizing enforcement strategies and investments, ODOT can enhance safety for both freight operators and the traveling public while ensuring that enforcement resources are deployed efficiently across the state.

6. Corresponding Submitter's Contact Information:

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7. ODOT Sponsor Contact Information (Required if Submitter is not an ODOT employee)

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This form is not a grant application or contract document. Please do not include proprietary information on this form. Once this form is received ODOT may revise and publish the problem statement. If selected, ODOT will assign investigator(s) of the department's choosing to conduct research.