



## Research Stage 1 Problem Statement

### Number 26-72 – “Modeling Vehicle-Level Speed Distribution Based on Segment-Level Speed Data”

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

Vehicle operating speed data is valuable to a variety of ODOT contexts, including operations modeling, safety analysis, and speed limit setting. Speed data has traditionally been captured at the individual vehicle level and aggregated distribution statistics (such as the median speed, 85th percentile speed, pace speed, or high-end speeding percentage) are used throughout the engineering process. Availability of this data is limited to short-term field speed studies or a relatively small number of permanent roadside hardware locations.

The recent introduction of commercially available probe-based segment-level average speed data has meant that it is possible to collect and analyze speed information at a system-wide scale and continuous pace. ODOT has made an ongoing and significant investment in licensing and supporting the Inrix XD real-time speed and travel time data product within the Regional Integrated Transportation Information System (RITIS) probe data analysis platform. The platform is made available to staff throughout the Agency and at partner public agencies across Oregon, serving a diverse and expanding range of uses.

Although both types of data sources describe the speed of traffic flow, there is no established guidance for analysts to estimate vehicle-level speed distribution statistics from the segment-level average speed data currently licensed by ODOT, or to understand how this relationship may differ in different operational contexts (land use, functional classification, etc.).

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

It would be valuable for ODOT and partner agencies to have a research-backed model for estimating vehicle-level speed distribution characteristics primarily based on the more readily available segment-level speed data. A formalized modeling of this relationship would also help to understand and evaluate the significance of differences in segment-level average speed data. New language to incorporate into existing guidance documents would help to analysts to accurately communicate their results.

This research could hopefully be developed using existing ODOT data sets such as: RITIS, continuous and short-term count stations capable of speed recording, historical speed zone investigations, and possibly additional roadside hardware logs (such as speed feedback signs, automated enforcement cameras, or connected vehicle environments). Ideally, the resulting model would be dependent on variables that are included in or can be easily obtained for Inrix XD segments. For example, Inrix functional code, federal functional classification, GIS land use data, geospatial network statistics, etc.

The final product would include the estimation model and user-friendly guidance and explanations of methodology, use, and limitations. These could be included in ODOT’s existing [Oregon RITIS Handbook](#) resource.

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.

| Name                     | Title                         | Email                                       | Phone        |
|--------------------------|-------------------------------|---|--------------|
| Chris Melson             | TPAU Manager                  | christopher.melson@odot.oregon.gov          | 971.332.0581 |
| Laura Jo Prusakiewicz    | Traffic Speed Zone Engineer   | laura.prusakiewicz@odot.oregon.gov          | 503.949.1156 |
| Christin McDaniel-Wilson | State Traffic Safety Engineer | christina.a.mcdaniel-wilson@odot.oregon.gov | 503.986.3573 |

#### 4. Decision making lenses

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 high value research need.

#### Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. Every mile driven in Oregon is powered by a clean source of fuel. We seek research that supports construction and maintenance operations are carbon neutral and investments in mobility that support travel by low and no emission modes. While every research project may not result in a reduction in emissions, transportation investments overall support emission reductions to achieve state goals. Oregon envisions a transportation system that is resilient in the face of seismic and climate events and impacts to the degradation of the natural environment are reduced. Our vision includes a transportation infrastructure is built in a way that avoids impacts on key habitat and results in better 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](#).

4f. 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 gasses (GHG)?

Yes

No

Unsure

4g. 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

4h. Will the 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

4i. Will the 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

4j. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

 Yes No Unsure

4k. Will the 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

4l. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

Modeling the GHG emissions of a given traffic flow depends (among other factors) on the speed of the traffic flow. Speed data, such as that derived from RITIS, is an input to emissions models such as EPA's MOVES model. There are certain assumptions as to the relationship between average segment-level speeds and the distribution of vehicle-level speeds that must be made as a part of these modeling efforts. This research would be an opportunity to validate those assumptions using Oregon data and provide guidance on improving or expanding Climate impact analysis and monitoring in Oregon.

## Equity

Equity can have many dimensions and impacts relating to communities, and transportation. It is important that problem statement proposals clearly explain in what capacities are equity dimensions or impacts being examined within problem statements. It is a goal of the OTP 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". Proposed research may have the intent of studying elements of this goal or apply analysis to specific transportation topics to ensure the resulting research recommendations is consistent with our equity goals. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#) and [Oregon Transportation Plan](#).

4a Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

 Yes No Unsure

4b 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

4c 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

4d 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

4e If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

Equipment for permanent vehicle-level speed monitoring is likely disproportionately located in areas of high historical transportation investment. Expanding the coverage of this data type would support equitable analytic capacity throughout Oregon communities. Because ODOT's current licensing terms allow for any public agency in Oregon to utilize RITIS without cost, there is opportunity for advancing equity in analytic capacity to communities without the resources to obtain it independently. It is possible (but unsure) that the research could assess equity impacts within the research context by considering an equity lens when developing the model product or in the user guidance or use-case development.

### 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](#).

4m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

Yes

No

Unsure

4n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

Yes

No

Unsure

4o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

Yes

No

Unsure

4p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

Yes

No

Unsure

4q. Will the solving the **transportation issue** support improving safety through **investing strategically**?

Yes

No

Unsure

4r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

Proactively identifying areas of excess speeding and determining the impact of interventions on high-end speeding is of interest to safety analysis. RITIS provides an unmatched resource for this work, and the proposed research would improve the utility of this technology in safety analysis. This research could

support lower-cost or systemic-scale analysis on this topic and improve the ability to clearly communicate safety-related data. Ultimately, better analytic capacity related to speed monitoring will increase the ability to make and evaluate safety investments strategically.

**5. Other comments:**

No additional comments, thank you for considering this topic.

**6. Corresponding Submitter's Contact Information:**

|              |   |
|--------------|---|
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