SPR RESEARCH PROGRAM
SECOND-STAGE PROPOSAL SUMMARY

PROBLEM NUMBER AND TITLE

24-26: Improving Guidance for Automated Speed Enforcement

PROBLEM SUMMARY

Fatal and severe injury crashes are on the rise in Oregon with one of the prominent factors being excessive speeding. As many cities and communities expand walking and cycling infrastructure there has been an increase in pedestrian fatalities and speeding is a key factor that rapidly increases the severity of a crash when a cyclist or pedestrian is involved. Although this is a well-known problem, the ability for law enforcement to make substantial interventions to vehicular speeding is limited due to their lack of human resources. Automated speed enforcement (ASE) systems are highly effective to reduce both operating speeds and severe crashes. Despite the overwhelming evidence for ASE systems to reduce speeding ODOT has no guiding documents for where, when, and how to cost-effectively deploy these systems. In addition, it necessary to consider carefully the impacts of ASE systems on equity and the public acceptance.

ODOT OBJECTIVES

With ODOT's highest consideration being safety, this project aims at creating guidelines for the deployment of ASE systems across Oregon. The guidelines will identify best practices for ASE deployment as well as key variables that contribute to speeding and the conditions that lead to an effective deployment of ASE systems. The guidelines will be developed utilizing an evidence-based approach and will also include recommendations to increase public acceptance and address potential equity concerns.

BENEFITS

Several cities in Oregon have been experimenting with mobile and/or fixed ASE systems in recent years. This research will provide ODOT with guidelines that can be applied statewide. In addition, the result of this research will be valuable to improve existing manuals such as the Fixed Photo Radar Camera and Red Light Running Camera Guidelines. ASE systems are a relatively low-cost alternative to mitigate excessive speeding and severe crashes. This project will improve both safety and mobility in Oregon.

SCHEDULE, BUDGET AND AGENCY SUPPORT

Estimated Project Length: 12 months.
Estimated Project Budget: $140,000
ODOT Support:
Angela Kargel, ODOT State Traffic Services Engineer and Unit Manager
Shyam Sharma, Region 1 Senior Traffic Unit Manager
Christina McDaniel-Wilson, State Traffic Safety Engineer

FOR MORE INFORMATION

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at:
https://www.oregon.gov/odot/Programs/ResearchDocuments/24-26.pdf

SPR RESEARCH PROGRAM
SECOND-STAGE PROBLEM STATEMENT
FY 2024

PROBLEM NUMBER AND TITLE
24-26: Improving Guidance for Automated Speed Enforcement

RESEARCH PROBLEM STATEMENT
National research shows that at least 56% of drivers travel above the posted speed limit (NHTSA 2015). In Oregon, the latest Transportation Safety Action Plan showed that speeding-related crashes accounted for 24% of the fatal and severe injury crashes between 2014 and 2018 (ODOT 2021). By 2020 this figure has increased from 20 to 29 percent. Although speeding is a known causality for these crashes, the ability for law enforcement to deter such driving behaviors is limited.

Oregon has consistently been a state with fewer law enforcement resources compared with other states with just 1.6 sworn officers per capita compared with 2.4 national average (BJS 2022). Some cities in Oregon have even less resources, for example the city of Portland has just 1.2 officers per 1,000 people. The confluence of speeding as a common roadway user behavior, speeding as a contributing factor in fatal and severe injury crashes, and the low amount of available law enforcement resources highlights the need for the identification of additional solutions like automated speed enforcement (ASE) systems and subsequent guidance documentation for deploying them across Oregon.

There is strong evidence that ASE systems can reduce injury crashes. Fixed unit ASE systems have been shown to reduce injury crashes by 47% when deployed on principal arterial roadways (Shin et al 2009). Despite the consensus that these systems have the ability to curb driver speeding behavior, it is important to understand how location placement, quantity, and other variables will impact system effectiveness.

The Oregon Department of Transportation (ODOT) requires evidence-based guidance on how and when to deploy automated speed enforcement (ASE) systems. This guidance document would include a summary of the expected crash injury reduction potential, a summary of the potential operational effects and best practices from other state DOTs and transportation agencies familiar with the best use of these systems. Best practices would include elements such as how best to inform and educate the public on ASE systems as well as how to deploy these systems in a way that is efficient but that does not further exacerbate existing social inequities. This guidance document would also aim to develop a method to identify the best locations on ODOT's roadway network to deploy ASE systems.

RESEARCH OBJECTIVES
ODOT's mission statement and values prioritize safety as a top goal in which the agency conducts its business. This research project furthers this goal by the following objectives: (1) Developing additional tools for agency staff to deploy to ensure safe speeds; (2) With a consideration for the cost effectiveness of these systems, the guidance document will dictate a data driven approach towards encapsulating roadway characteristics and driver behavior to better assign these devices as to optimize the potential reduction in speeds and subsequent crash reductions therein. (3) Understanding how ASE systems can be deployed while ensuring broad public acceptance without exacerbating existing social disparities.

WORK TASKS, COST ESTIMATE AND DURATION
Task 1 — Literature review on the deployments of automated speed enforcement systems (3 months)
This task is focused on the documentation of best practices in Oregon and other state agencies' deployment of ASE systems with a focus on the decision process to locate them in order to achieve the best cost-benefit

ratios. This review will also delve into the different types of systems in terms of equipment, installation, and additional physical infrastructure necessary for successful deployment.

Task 1 Deliverable: Synthesis of automated speed enforcement systems utilized by other state agencies.

Task 2 — Identification of empirical, evidence-based studies towards roadway characteristics and driver behaviors for consideration (3 months)
This task would analyze the expected crash frequency and injury reduction potential as function of roadway, traffic, and location characteristics.

Task 2 Deliverable: Summary of key variables affecting the effectiveness of ASE systems

Task 3 — Development of appropriate location guidelines to obtain broad public acceptance of the system (4 months):
Several studies have shown that there is higher acceptance when ASE devices are located near school zones and pedestrian and bicycle facilities (NHSTA 2020). It has also been shown that ASE systems can disproportionately affect low-income and minority communities. This section will explore how other state agencies have approached these considerations to better locate and improve acceptance in the array of different communities exhibited in Oregon.

Task 3 Deliverable: Recommendation of strategies to increase local public acceptance and equity.

Task 4 — Final report, collection, and summarization from Tasks 1-3 (2 months): The final report will be the concatenated results of tasks 1-3 with a summarization section towards best practices identified for stakeholder utilization.

Task 4 Deliverable: Full guidance document including all sections from previous tasks and a summary of best practices found.

Key Deliverables:

This research would develop a guidance document that summarizes the best practices of ASE systems installation including how best to engage communities that will be impacted by ASE systems. Additional information in the guide will include site selection prioritization frameworks that would be most effective at meeting all the goals of the ASE deployment including safety, financial feasibility, and social equity. In addition, a fiscal feasibility analysis would be created to help agency staff and leadership understand the different ASE models and cost structures for available systems. Guidance from this research will be included in other relevant ODOT manuals like the Fixed Photo Radar Camera Guidelines for State highways (ODOT 2016).

Estimated Project Length: 12 months.
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IMPLEMENTATION
The research can improve the ODOT manuals like the Fixed Photo Radar Camera Guidelines for State highways, which guide the statewide implementation. The research results can be used by DMV Office of Safety, Traffic and Roadway Section, and Regions to make better decisions on where and how to deploy Automated Speed Enforcement. While Region 1 plans to deploy photo radar, which is one type of automated speed enforcement, for speed zone enforcement on Powell Boulevard, the implementation of the research results could include identifying of other locations where Automated Speed Enforcement could be deployed to save lives and improve safety and mobility.

POTENTIAL BENEFITS

This research will provide ODOT with guidance documents on the proper deployment of automated speed enforcement systems. The focus will be the deployment of ASE systems to obtain speed reductions along corridors or at intersections, with high public acceptance and reducing negative impacts in terms of equity.

PEOPLE

ODOT champion(s):

Angela Kargel, ODOT State Traffic Services Engineer and Unit Manager

Problem Statement Contributors:

ODOT: Josh Roll, Research Coordinator; Christina McDaniel-Wilson, State Traffic Safety Engineer; Xiugang "Joe" Li, Research Coordinator; Kristin Twenge, DMV Law Enforcement/Judicial Program Manager; Amanda Salyer, Region 2 Traffic Investigation Engineer; Nicole Charlson, Region 2 Transportation Safety Coordinator; Shyam Sharma, Region 1 Senior Traffic Unit Manager

University: Miguel Figliozzi, Professor of PSU; Haizhong Wang, Associate Professor of OSU; Brian Staes, Graduate Research Assistant of OSU

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7. Oregon Department of Transportation and Oregon Traffic Control Devices Committee. Fixed Photo Radar Camea Guidelines for State Highways. (2016). https://www.oregon.gov/odot/Engineering/TRSDocs/Speed_Fixed-Photo-Radar-Camera-Guidelines.pdf
8. National Highway Transportation Safety Administration. "A Highway Safety Countermeasure Guide for State Highway Safety Offices. (2020).

STAFF REVIEW PAGE

Literature Check

TRID&RIP

☒ A review of TRID & RIP databases found no existing research that answers the research question

Technology & Data assessment

☐ No Identified T&D output

☐ At the end of this project, the implementing unit(s) within ODOT will need to coordinate the adoption of new technology or data in order to realize the full potential of this research.

Cross-agency stakeholders

- List stakeholders or impacted units
  ODOT Traffic and Roadway Section
  DMV Office of Safety
  Region 1 Traffic Unit
  Region 2 Traffic Unit

- Identify any issues of concern raised by an ODOT stakeholder. Note expected mitigation
  None