

2016 UDOT RESEARCH PROBLEM STATEMENT

*** Problem statement deadline is March 14, 2016. Submit statements to Tom Hales at tahales@utah.gov. ***

Title: Using EERPAT to Model Disruptive Technologies in Utah

No. (office use): 16.05.07

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Select One Subject Area

Materials/Pavements

Maintenance

Traffic Mgmt/Safety

Preconstruction

Planning

Public Transportation

1. Describe the problem to be addressed.

Autonomous and connected vehicles are disruptive technologies. Their effects on travel demand and capacity are unknown. The travel demand models currently used in Utah are complex and require significant resources to use for scenario testing. Multiple theories abound regarding the impact autonomous and connected vehicles will have on travel demand, which requires numerous scenario tests with varying degrees of assumptions. The effort required to test a handful of travel behavior assumptions would require months of sustained effort and resources. A different kind of tool is required to more quickly evaluate the impact that autonomous and connected vehicles will have on travel demand.

2. Explain why this research is important.

This research will deliver a range of transportation system performance metrics (e.g., VMT, emissions, fuel consumption, etc.) and information on household spending for transportation while exploring several assumptions around autonomous and connected vehicles. This effort will help decision-makers at UDOT and MPOs in Utah to evaluate various autonomous and connected vehicle scenarios and assumptions to produce a range of travel demand, energy, and environmental impacts. The results will help these agencies understand how technology may affect travel along the Wasatch Front and statewide.

3. List the research objective(s):

1. Extend the Energy and Emissions Reduction Policy Analysis Tool (EERPAT), a statewide scenario planning model, to consider various autonomous and connected vehicle assumptions and their impact on a range of transportation system performance metrics. Potential scenario types that could be evaluated using the extended tool include the following:
 - a. Autonomous passenger vehicles.
 - b. Autonomous passenger vehicles and electric vehicles.
 - c. Autonomous passenger vehicles and connected vehicles (freight).
 - d. Connected vehicles only (freight).
 - e. Connected freight vehicles and connected passenger vehicles.
2. Create a visualization of the analysis results that accounts for a wide range of model assumptions that have been run, so an enduser can evaluate the effects of various assumptions on travel demand, emissions, and other system metrics.

4. List the major tasks:

The research team will begin with the EERPAT model that already includes Utah data and has been calibrated to existing conditions. This model has been used to test several alternative vehicle technology scenarios for UDOT, including growth of electric vehicle usage. Additional major tasks include the following:

1. Conduct a literature review and workshop with stakeholders to design scenarios and review range of assumptions.
2. Add and test new inputs and functionality into the EERPAT model to address autonomous and connected vehicle technology.
3. Run multiple scenarios with varying degrees of assumptions.
4. Create a visualization of the model outputs as a function of input assumptions.
5. Document the results and produce a final report.

5. List the expected results:

1. An enhanced version of the EERPAT model available to agency staff and researchers for use in future planning that incorporates various autonomous and connected vehicle assumptions.
2. Documentation, including visualization of the model results, that can be used by agencies to evaluate assumptions surrounding autonomous and connected vehicles.

6. Describe how this research will be implemented.

Agency staff will have visualized analysis results that will allow them to rapidly assess varying assumptions of autonomous and connected vehicles. This tool and the accompanying results will be useful in performing sensitivity analyses on future planning studies and project evaluations as a means to screen potential alternatives for further detailed analysis.

**7. Requested from UDOT: \$50,000
(or UTA for Public Transportation)**

Other/Matching Funds: \$0

Total Cost: \$50,000

8. Outline the proposed schedule, including start and major event dates.

We anticipate needing less than one year to complete this research project. The proposed schedule is as follows (subject to actual notice to proceed):

- End of FY 2016—Contracting
- July/August 2016—Project kickoff meeting
- September/October 2016—Literature review and scenarios/assumptions workshop
- November 2016 through January 2017—Testing for new functionality
- February/March 2017—Running scenarios and visualizing results
- April/May 2017—Draft/final report