

Project Information Form

Project Title:	Reducing Truck Emissions and Improving Truck Fuel Economy via Intelligent Transportation System Technologies
University:	University of Southern California
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Funding Source(s) and Amounts Provided (by each agency or organization):	United States Department of Transportation (US DOT) - \$90,000.00
Total Project Cost:	\$90,000.00
Agency ID or Contract Number:	DTRT13-G-UTC29
Start and End Dates:	May 20, 2014 to September 30, 2017
Brief Description of Project:	Trucks are typically viewed as any other vehicle in traffic management. However, trucks have different dynamics and sizes, which create traffic disturbances that affect other vehicles causing increased fuel consumption and pollution. The aim of this project is to use intelligent transportation system (ITS) technologies that take into account the presence of trucks in the traffic flow, in order to improve impact on the environment by reducing fuel consumption and pollution levels in areas where the truck volume is relatively high. The researchers propose an integrated variable speed limit (VSL), ramp metering (RM) and lane change (LC) controller using feedback linearization. The integrated controller keeps the bottleneck flow at the maximum level and homogenizes the density and speed of the traffic flow along the highway sections. The proposed feedback linearization controller is then compared to a widely-used model predictive traffic controller in terms of performance and robustness with respect to perturbations on traffic demand, model parameters and measurement noise. Results show that both controllers are able to improve the total time spent, which leads to improvements in fuel economy and emissions, under different levels of perturbation and noise. The feedback linearization controller however, guarantees good performance and robustness properties than the model predictive controller with less computational effort.
Describe Implementation of Research Outcomes (or why not implemented): (Attach any photos)	



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Impacts/Benefits of Implementation (actual, not anticipated):	
Web Links <ul style="list-style-type: none">• Reports• Project website	https://ncst.ucdavis.edu/project/usc-dot-004/ https://escholarship.org/uc/item/2rr3b8mz