CENTER FOR CONNECTED AND AUTOMATED TRANSPORTATION

UTC Project Information	
Project Title	Operations of Connected and Autonomous Freight Trucks under Congestion and Infrastructure Cost Considerations
University	University of Illinois at Urbana-Champaign
Principal Investigator	Imad Al-Qadi, Yanfeng Ouyang, Jeffery Roesler, Hasan Ozer, Hadi Meidani
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Funding Source(s) and Amounts Provided (by each agency or organization)	$232,060 CCAT funding Request; 232,060 [Cost sharing of cash (34%) and in-kind (66%) contributions]
Total Project Cost	$464,120
Agency ID or Contract Number	69A3551747105
Start and End Dates	11/1/2017- 9/30/2022
Brief Abstract of Research Project	This proposal aims at developing an integrated connected and autonomous truck routing model that simultaneously considers interdependency between traffic lane/"track" use, platooning, and pavement deterioration and rehabilitation, such that the total life-cycle societal costs due to infrastructure investment, traffic delay, and pavement life-cycle costs are minimized.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The outcome of the study will be a recommendation about how to implement active sensors such as RFID and multi-functional piezoelectric sensors into existing roadways and to assess long-term durability.
Impacts/Benefits of Implementation (actual, not anticipated)	The outcome of the study will help achieve near-zero maintenance during service life and resilience over a range of extreme weather conditions during day and night. Successful implementation would optimize lane use of heavy trucks over the planning horizon, such that the deterioration process of pavements can be decelerated. In addition, the investigation of the wheel wander of trucks following each other in way that damage accumulation is uniformly distributed over a lane will allow healing of the pavement and alternate compression/tension of loaded points and, therefore, excessive damage accumulation on a specific point(s) over a lane will be better controlled and pavement service life will be prolonged. When implemented, the research would result in guiding vehicles in a way that their tires would pass over existing cracks at the pavement surface, so that while crack development at the pavement surface is controlled by minimizing the tension strain/stresses applied on the cracks, transverse compressive strains/stresses can potentially minimize the width of the cracks.

Web Links • Reports • Project website	