

Research Project Descriptions

UTC Project Information	
Project Title	Modeling Resilience and Impact in Multi-Modal Transportation Networks
University	The University of Oklahoma
Principal Investigator	PI: Kash Barker, The University of Oklahoma (OU)
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Funding Source(s) and Amounts Provided (by each agency or organization)	SPTC: \$46,087 The University of Oklahoma: \$46,087
Total Project Cost	\$92,174
Agency ID or Contract Number	DTRT13-G-UTC36 SPTC 15.1-38
Start and End Dates	4/15/16 - 4/14/17
Brief Description of Research Project	<p>PROBLEM: Recent US planning documents focus on transportation network preparedness, emphasizing “securing and managing flows of people and goods” along transportation networks. Presidential Policy Directive 21 states that critical infrastructure “must be secure and able to withstand and rapidly recover from all hazards.” This combination of the abilities to (i) withstand the effects of a disruption and (ii) recover timely is often referred to as resilience.</p> <p>PROPOSED SOLUTION: This research addresses the vulnerability dimension of resilience by approaching the importance of the components in a multi-modal transportation network relative to (i) their commodity flows and (ii) the interdependent, multi-regional, multi-industry impact of those commodity flows (as a primary role of the multi-modal network is as a connector of multiple industries). The study will (i) develop a multi-commodity network flow representation of a multi-modal transportation network, relate disruptions to interdependent multi-industry and multi-regional losses, (ii) characterize transportation network components to multi-regional, multi-industry economic vulnerability, and (iii) develop a means to measure the effectiveness of preparedness decisions to reduce the impacts of transportation network disruptions (e.g., via optimal re-routing, via increased capacity, via network completion) among different transportation modes. The importance of this work to transportation planners is in understanding the contribution of individual components in the multi-modal network to economic productivity given a protracted disruption. This work could also</p>

	<p>assist logistics planners in measuring the efficacy of rerouting strategies given a disruption, and policy makers will be benefit from the final deliverables as a mean to analyze how network development decisions in terms of the accessibility of potential nodes/links within the network and the availability of incremental capacities would improve the network survivability at the time of a disruption.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project website 	