



Exhibit F - UTCRS

UTC Project Information	
Project Title	Safety Modeling of Highway Railway Grade Crossings using Intelligent Transportation System Data
University	University of Nebraska-Lincoln (UNL)
Principal Investigator	Laurence Rilett, Ph.D., P.E., Civil Engineering (PI)
PI Contact Information	262D Whittier Research Center P.O. Box 830851 Lincoln, NE 68583-0851 Office (402) 472-1993 lrillet2@unl.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	Federal Funds (USDOT UTC Program): \$85,000 Cost Share Funds (UNL): \$42,5000
Total Project Cost	\$127,500
Agency ID or Contract Number	DTRT13-G-UTC59
Start and End Dates	November 2013 – December 2016
Brief Description of Research Project	Drivers face a number of decisions as they approach at a-grade highway railway grade crossings (HRGCs) including what approach speed is appropriate and whether to stop at the crossing. In turn, a large number of factors affect these decisions including presence of other vehicles and their location, presence of a train(s) and their location/speed, presence of traffic signals and their status, traffic signal timing, etc. If HRGC's are to be made safer, it is critical to understand the relationship between these factors and the driver's decision on whether to proceed across the HRGC or to stop. Most train safety studies collect this type of information manually which can be time consuming and expensive. This project will first develop an automatic data collection system that will obtain, process and store all relevant information including vehicle approach speed and location, train approach speed and location, traffic signal status, warning system information, weather information, and driver violations at the HRGC. The system will be tested in an urban

	<p>environment and will form part of a long-term HRGC test bed in Lincoln, Nebraska. A portable data-collection system prototype will be used to collect data at various rural intersections. The data will then be used to develop a predictive model of driver violation as a function of the relevant factors. The goal of the research is to understand the complex behavior of drivers at HRGCs and to recommend effective countermeasures that will increase the safety of our nation's HRGCs.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>Though this research study is location specific, the provided methodology can easily be expanded to a wide range of traffic locations and situations. This is important in order to do the violation-need study such as the determination of optimal clearance interval or the improvement of HRGC geometry. The results of the study have not been used for further implementation because the methodology needs to be adapted for specific locations.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>The proposed research method has not been implemented yet. However, work on this project has resulted in one paper presentation at the Transportation Research Board 96th Annual Meeting, and a doctoral dissertation in progress, which is expected to be defended in August 2017.</p> <p>The information on the paper that was presented at the TRB Annual Meeting is provided hereafter:</p> <ul style="list-style-type: none"> • Zhao, Li and Rilett, L., "Dynamic Model of Driver Approaching Behaviors at Highway-Rail Grade Crossings," Transportation Research Board 96th Annual Meeting, Washington, D.C., January 10, 2017. <p>A detailed report summarizing all of the work performed under this project is also made available and can be downloaded from the UTCRS website at the link provided below.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project website 	<p>http://www.utrgv.edu/railwaysafety/_files/documents/reports/Modeling-of-HRGC-Using-ITS_Project_Final_Report_021017.pdf</p> <p>http://www.utrgv.edu/railwaysafety/research/operations/modeling-of-hrgc-using-its/index.htm</p>