

EXHIBIT F

UTC Project Information	
Project Title	A Multiobjective Reinforcement Learning Framework for Equitable Toll Design for Express Lanes
University	North Carolina A&T State University
Principal Investigator	Venktesh Pandey
PI Contact Information	vpandey@ncat.edu , 336-285-3687
Funding Source(s) and Amounts Provided (by each agency or organization)	Federal Funds (USDOT UTC Program): \$57,980 Cost Share Funds (NCAT): \$28,990
Total Project Cost	\$86,970
Agency ID or Contract Number	69A3551747125
Start and End Dates	Jun 1, 2023—Dec 31, 2023
Brief Description of Research Project	<p>Deep reinforcement learning (Deep-RL) algorithms have been used to learn the traffic control strategies in the areas of signal control, pricing, and the control of connected and automated vehicles in mixed autonomy conditions. While Deep-RL algorithms can be extended for other traffic control applications, the interpretability of the model and optimization of multiple objectives (such as increasing revenue while enforcing equitable tolls) together remain challenging and has been left unaddressed. The objective of this implementation-focused research project is to create an open-source tool incorporating multiobjective reinforcement-learning-based optimization of express lane discounts, with the aim of making the previous research findings (from CATM project: Equitable Dynamic Pricing for Express Lanes) more accessible and enhancing the integration of Artificial Intelligence tools for multi-objective optimization of transportation systems. The project involves (a) designing an open-source platform that integrates advancements in multiobjective reinforcement learning literature for designing discounts for express lanes, (b) testing the transferability and usefulness of the tool across multiple datasets and development platforms,</p>

	and (c) conducting a technology transfer to enhance accessibility for future researchers, practitioners, and policy makers. The research findings will enable more effective design and optimization of express lane discounts for equitable transportation systems.
Describe Implementation of Research Outcomes (or why Not implemented) Place Any Photos Here	The project is currently under progress and the implementation plan is yet to be discussed. The project's aim to make research findings widely accessible will foster collaboration, knowledge sharing, and advancements in transportation systems and multiobjective optimization. The project will assist transportation agencies directly involved with congestion pricing, and policy makers and urban planners by addressing important considerations like equitable access, revenue generation, and infrastructure resilience, and thus providing valuable insights to inform traffic control strategies and tolling policies.
Impacts/Benefits of Implementation (actual, not anticipated)	Pending project completion
Web Links <ul style="list-style-type: none"> • Reports • Project Website 	

