UTC Project Information		
Project Title	MPC-599 – Connected-Autonomous Traffic Signal Control Algorithms for Trucks and Fleet Vehicles	
University	University of Wyoming	
Principal Investigator	Milan Zlatkovic Mohamed Ahmed	
PI Contact Information	Milan Zlatkovic Assistant Professor University of Wyoming Phone: (307) 766-2390 Email: mzlatkov@uwyo.edu ORCID: 0000-0002-6777-230X Mohamed Ahmed Associate Professor	
	University of Wyoming Phone: (307) 766-5550 Email: mahmed@uwyo.edu ORCID: 0000-0002-1921-0724	
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Start and End Dates	April 16, 2019 to July 31, 2022	
Brief Description of Research Project	The standards and protocols of CAV (connected-autonomous vehicles) technologies are currently in development, with limited number of tests and implementations. The installation of CAV hardware/software in traffic signals in Wyoming creates opportunities for developing methods and algorithms that would help the State's unique transportation challenges. ConnexUs Lear connected-vehicle hardware will first be installed at six signalized intersections near freeway interchange ramps in Evanston, Rock Springs, Rawlins, Laramie and Cheyenne. This study will review the current protocols and recommend options applicable to Wyoming conditions. It will analyze, assess and develop traffic control algorithms that would use CAV technologies to improve operations and safety through signalized intersections. The focus will be on optimizing operations of freight and emergency vehicles through signalized intersections. The analyzed strategies will include emergency preemption, speed harmonization and freight priority. Other strategies that would improve traffic and operations will also be assessed for future implementation. The developed control	

	algorithms will be tested in a virtual environment (through traffic microsimulation and driving simulation) and the recommendations for field implementation will be provided. The researchers will work closely with WYDOT engineers to develop control protocols that would have significant practical applications. The programs will be tested on the six signalized intersections, but the transferability to other locations will also be explored. Furthermore, because of the importance of these technologies on the national level, this study will benefits transportation agencies across the U.S., especially those that face similar transportation challenges.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	This research is dealing with emerging transportation technologies resulting from vehicle connectivity. Its results and methodologies will increase the understanding of connected technologies for special signal operations. This will ultimately lead to increased operations and safety in the vicinity of signalized intersections. The main focus is on freight and transit vehicles, which have multiple implications on transportation systems. Additionally, the research will increase the understanding of preemption strategies for emergency vehicles by utilizing connected technologies. Currently the research is not implemented in the field, but WYDOT and UDOT are interested in the outcomes and recommendations of the research.
Impacts/Benefits of Implementation (actual, not anticipated)	This research develops new and improves on the existing vehicle communication protocols, and creates signal control programs for special signal operations with the goal of improving operations and safety at signalized intersections. It has the potential to improve the control strategies related to speed harmonization, queue warning, and preemption/priority, especially on facilities with high truck traffic percentages and high-ridership transit routes.
Web Links • Reports • Project Website	<ul> <li>MPC Research Report – <u>Connected-Autonomous Traffic</u> <u>Control Algorithms for Trucks and Fleet Vehicles</u></li> <li>Wyoming DOT Final Report – <u>Connected-Autonomous Traffic</u> <u>Signal Control Algorithms for Trucks and Fleet Vehicles</u></li> <li>Journal Article – <u>Conditional Transit Signal Priority for</u> <u>Connected Transit Vehicles</u></li> <li>Journal Article – <u>Multi-Level Conditional Transit Signal</u> <u>Priority in Connected Vehicle Environments</u></li> <li>Journal Article – <u>Assessment of Queue Warning Application on</u> <u>Signalized Intersections for Connected Freight Vehicles</u></li> </ul>