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Project Title	Deployment of Preemption based Motion Sickness Prevention Technology on a Testbed Vehicle in Mcity	
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Industry or Government Principal, organization, and contact information	Industry Champion 1: Srinivas Bidare, Founder and CEO, Intent Design, sribid@intent-design.com, 248-866-1929	
Most relevant CCAT research thrusts (choose all applicable)	<input type="checkbox"/> Control & Operations <input checked="" type="checkbox"/> Enabling Technology <input checked="" type="checkbox"/> Human Factors <input type="checkbox"/> Infrastructure Design & Management <input type="checkbox"/> Modeling & Implementation <input type="checkbox"/> Policy & Planning	
Funding Request	\$200,000	
Matching Funds and Source (if any)	\$30,000 Office of Future Mobility and Electrification (OFME), Michigan Economic Development Corporation (MEDC)	
Total Project Cost	\$230,000	
Contract Number	69A3551747105	
Project start/end dates	April 1, 2022 – March 31, 2023	
Project Abstract	The objective of this project is to deploy a novel motion sickness prevention technology (PRACT) on a custom-designed vehicle testbed in Mcity, and experimentally validate its efficacy under realistic driving conditions with human subjects. The PRACT technology employs prediction algorithms to anticipate impending inertial events associated with driving and makes preemptive interventions (e.g. via tip/tilt seat, tightening seat-belt, and haptic	





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	<p>stimuli) before the inertial events actually happen, thereby averting motion sickness.</p> <p>Our previous CCAT grant has enabled the development of several key components of the PRACT technology – a vehicle testbed comprising various mechatronic modules for preemption; instrumentation to measure the states of the vehicle and the passenger; triggering algorithms necessary to preemptively actuate the mechatronic modules; an Mcity path that emulates city and highway driving; and, an IRB approved human subject testing protocol. This project aims to bring together and integrate these previously developed components to demonstrate a Proof of Principle of the PRACT technology, for one set of experimental conditions.</p> <p>By mitigating motion sickness and enhancing comfort and productivity for passengers, the PRACT technology will help overcome a major practical impediment in the adoption of Autonomous Vehicles by the society. This, in turn, will usher in the numerous benefits of AVs – fewer road accidents and fatalities, reduced traffic congestion, lower energy consumption and environmental footprint, reclaimed productivity for passengers, and equitable access to transportation.</p>
<p>High-level implementation plan</p>	<ul style="list-style-type: none"> • Deploy PRACT technology Proof of Principle at Mcity under realistic driving conditions, for one set of experimental conditions • Compile and analyze experimental data, and establish findings and conclusions in technical reports
<p>Project Metrics</p>	<ul style="list-style-type: none"> • Establish the value proposition of the PRACT motion system prevention technology for automotive industry stake-holders • Educational / professional training of students in human factors, instrumentation, mechatronic design & motion sickness • Broaden equity and participation by engaging a diverse group of students, researchers, and test-subjects in transportation research • Research publications and patent application





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	<ul style="list-style-type: none">Pursue technology transfer and industry adoption options: Licensing, strategic partnership, startup, or a combination
Web Links: [leave blank until project approval]	<ul style="list-style-type: none">ccat.umtri.umich.eduhttps://psdl.engin.umich.edu/preact.php

