Project Title: The PennSTART Safety Standards Project

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Center Name: Safety21 National University Transportation Center for Promoting Safety

Research Priority: Promoting Safety

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Project Partners:

- RIDC

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Project Description:

The Pennsylvania Safety Transportation and Research Track (PennSTART) and the Connected Deployment Corridor aim to revolutionize the testing and deployment of emerging transportation technologies, such as autonomous (AVs) and electric vehicles (EVs). As we navigate this transformative period in transportation, the safety of these technologies remains paramount. The proposed PennSTART Safety Standards Project, initiated in two phases, is dedicated to establishing rigorous safety protocols for testing: Phase 1) A safety plan review process for testing occurring at PennSTART and, Phase 2) A PennSTART standardized autonomous vehicle safety certification that combines federal standards/tests as well as the tests and internal standards that companies/research universities use. Safety21 (2023-2024) funding is requested for Phase 1 at the moment. **Phase 1: PennSTART Safety Plan Review (Focus of Current Proposal)** The immediate focus of this proposal is the development of the PennSTART Safety Plan Review. This phase is crucial as it lays the groundwork for all subsequent testing activities at PennSTART. The objective is to devise a comprehensive and standardized review process that evaluates and ensures the safety of tests proposed by PennSTART users, whether they are companies, academic institutions, or public safety entities. Methodology: 1. Compilation of Test Scenarios: Assemble a detailed list of potential test scenarios, with an emphasis on those that might inherently carry risks. 2. Risk Assessment: Undertake a meticulous risk assessment for each test scenario to discern potential hazards. 3. Digital Twin Utilization: For scenarios with elevated risks, employ digital twins for preliminary testing, mitigating the need for immediate physical tests. 4. Safety Plan Submission and Review: Implement a structured system for users to submit their safety plans, which will then undergo a stringent review by PennSTART safety experts. 5. Approval Criteria Development: Formulate clear criteria for test approval, ensuring that proposed tests neither introduce undue safety risks nor disrupt other site activities. **Future Considerations: Phase 2 - PennSTART Standardized AV Safety Certification** While the immediate focus is on Phase 1, it's worth noting that the insights and data gathered will inform Phase 2. This subsequent phase aims to create a standardized AV safety certification, amalgamating federal standards with those employed by industry leaders and research institutions. The certification will serve as a benchmark for AV safety, ensuring that vehicles meet a rigorous set of criteria before deployment. Ultimately, the Safety Review Plan and PennSTART AV Safety Certification could lead to technology deployment in the Connected Deployment Corridor project. Once a user has passed the PennSTART certification in the closed and safe PennSTART testing environment, then they could be eligible for a deployment project in the Connected Deployment Corridor. In addition, this Safety Standards Project could benefit other test tracks and the AV industry nationally as no standardized safety system currently exists for the autonomy industry.

Outputs:

The PennSTART Safety Standards Project is poised to produce a series of pivotal outputs. Foremost among these is the establishment of a comprehensive safety plan review process, which will serve as a benchmark for testing activities at PennSTART. This process will be underpinned by a detailed compilation of potential test

scenarios, risk assessments, and criteria for test approval. Additionally, the project will leverage digital twins, offering a novel approach to testing scenarios that carry inherent risks. The insights and data gathered during Phase 1 will lay the foundation for Phase 2, which aims to create a standardized AV safety certification. This certification will amalgamate federal standards with industry and academic benchmarks, serving as a national reference for AV safety.

Outcomes/Impacts:

The project's outcomes are anticipated to have profound impacts on the transportation sector. By establishing rigorous safety protocols, PennSTART will ensure that emerging transportation technologies, such as AVs, are tested and deployed with utmost safety considerations. This will bolster public trust in these technologies, paving the way for their broader acceptance and integration. The standardized AV safety certification, informed by Phase 1 insights, will serve as a national benchmark, filling a current void in the autonomy industry. Furthermore, the project's outcomes will facilitate technology deployment in the Connected Deployment Corridor, ensuring that only rigorously tested and certified technologies are deployed. This will enhance transportation safety, reliability, and efficiency, aligning with the broader goals of the US DOT and Safety21. The project's grassroots approach to data collection, involving parents and families, will offer invaluable insights, potentially revolutionizing the way data is gathered in transportation research.