**Exhibit D – Research Project Requirement Template**

**From Perception to Policy: Measuring Road Driver Behavior and Public Support for Autonomous Truck Regulation**

**Recipient/Grant (Contract) Number:** The University of Texas at Austin/Grant # 69A3552344815 and 69A3552348320

**Center Name:** National Center for Understanding Future Travel Behavior and Demand (TBD)

**Research Priority:** Improving Mobility of People and Goods

**Principal Investigator(s):** Sofia Perez-Guzman; Mengyao Li

**Project Partners:** N/A

**Research Project Funding:** $108,468

**Project Start and End Date:** 01/01/2026 – 12/31/2026

**Project Description:** This project will investigate how human drivers respond when sharing the road with autonomous trucks, generating behavioral evidence to guide public policy, risk communication, and regulatory design for the safe and economically beneficial deployment of freight automation. Truck automation is projected to deliver major efficiency and safety gains to the United States economy by addressing driver shortages, improving fuel efficiency, and reducing crash risk on long-haul corridors. Yet, public acceptance and regulatory readiness remain key barriers to realizing these benefits. To address this gap, the study will move beyond stated attitudes to examine observed behavior using the construct of existence acceptance, i.e., the degree to which non-users feel comfortable with a technology operating in their environment. Four determinants of acceptance will be explored: prior experience, perceived benefits, perceived threats, and affective responses. The study will employ a controlled driving simulation in which licensed participants encounter scripted highway scenarios involving overtaking and merging maneuvers with both autonomous and human-driven trucks, as well as passenger cars. Experimental conditions will vary the informational framing of autonomous trucks, i.e., from neutral descriptions to messages emphasizing regulatory safeguards and societal benefits, to test how communication context shapes trust, compliance, and comfort. During the simulation, vehicle kinematics (speed, headway, and lane position), gaze tracking, and physiological responses (heart rate and electrodermal activity) will be recorded. These measures will be paired with pre- and post-drive surveys assessing perceived safety, trust, and support for regulatory oversight. Data analysis will integrate behavioral and psychophysiological modeling to quantify the effects of informational framing and exposure on driver adaptation and perceptions of safety. The findings will directly inform safe automation and freight efficiency, helping decision-makers balance innovation with public trust and position autonomous trucking as a driver of economic productivity and safety in the national freight system.

**US DOT Priorities:** Section left blank until USDOT's new priorities and RD&T strategic goals are available in Spring 2026

**Outputs:** This project will generate both a multimodal dataset and methodological advancements for analyzing how drivers respond to autonomous trucks in mixed-traffic conditions. The dataset will integrate behavioral, physiological, gaze, and attitudinal measures collected through controlled driving simulations that vary information framing, vehicle type, and encounter dynamics. In parallel, the project will advance analytical approaches for interpreting complex, multimodal data by applying statistical techniques that integrate behavioral, physiological, and psychological signals and balance insights from small- and large-sample settings. The resulting data, models, and documentation will be designed for transparency, replication, and interoperability, allowing other researchers and agencies to extend the methods to broader

studies of automation and road safety. Together, these outputs will contribute both new empirical evidence and methodological tools for understanding human adaptation to automated freight systems and for supporting the safe and publicly trusted deployment of emerging transportation technologies.

**Outcomes/Impacts:** This research will enhance the empirical and analytical foundations for regulating and deploying autonomous trucking technologies in the United States. By connecting observed driving behaviors and physiological responses to perceptions of trust and safety, the study will provide quantitative evidence on how framing, transparency, and exposure influence public comfort with automation. These insights will help transportation agencies and policymakers anticipate behavioral responses during the early stages of deployment, thereby improving the design of communication materials, demonstration programs, and safety evaluation protocols. In addition to its immediate policy relevance, this project will support the economic goals of truck automation by facilitating a smoother and safer integration of autonomous freight vehicles into highway networks. The behavioral parameters and modeling framework developed in this research can be applied to larger simulations and cost-benefit analyses to assess the impacts of automation on freight efficiency, fuel consumption, and crash reduction. Over time, the findings will help regulators, planners, and industry stakeholders develop informed, data-driven strategies that strike a balance between innovation, economic productivity, and public trust. This alignment will advance the U.S. Department of Transportation's broader objectives of safety, mobility, and transforming the freight system into a more sustainable model.

**Final Research Report:** A URL link to the final report will be provided upon completion of the project.