August 11, 2022

Dr. Steven Cliff
Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: General Motors-Receipt of Petition for Temporary Exemption From Various Requirements of the Federal Motor Vehicle Safety Standards for an Automated Driving System-Equipped Vehicle

Docket No. NHTSA-2022-0067

Dear Dr. Cliff,

As a Ph.D. candidate in transportation engineering at the University of Texas at Austin, I'm writing to express my support of Docket No. NHTSA-2022-0067, which is General Motors' petition to manufacture the Cruise Origin with exemptions. My research studies large-scale simulations of shared autonomous electric vehicles to understand mobility and emissions impacts. Although I cannot speak to the technical requirements in the six FMVSS standards, I can comment on how the Origin can advance public interests. NHTSA is proposing terms and conditions to the potential grant of General Motors' exemption request that would: (1) provide reasonable data sharing requirements of automated driving systems (ADS) that would enable appropriate regulations in the mid- to long-term, and (2) enable the transition to high-occupancy surface transportation at a lower per-mile cost than conventional modes, which may advance transportation and environmental justice. In the following paragraphs, I comment on the proposed terms and conditions that NHTSA may apply to General Motors' exemption request.

1. I support the 24-hour requirement to report crashes, provided that the crash results in injury or fatality (i.e., not a property damage only (PDO) crash in the KABCO system), as deemed by appropriate law enforcement officers. PDO crashes should be reported within a relaxed period (e.g., 7 days), given that urban areas are likely to see both the Origin and this crash type.
2. I fully support sections a-e. Although "near misses" and unexpected events such as vehicle bunching at cul-de-sacs are opportunities to learn more, section 2.f may impose an unnecessary burden on General Motors if made mandatory and not voluntary. Section 2.g should include staff that can speak to the remedial steps taken from "minimal risk condition fallback" events.
3. I support the cybersecurity incident response plan and reporting requirements.
4. I support the "stop order" condition, provided that cybersecurity experts believe this would not create a reason to exploit the Origin vehicles due to the verification system of the "stop order."
5. I fully support the delegation of authority to State and local authorities with jurisdiction to impose and change ADS/ODD requirements, provided that these requirements do not counter transportation and environmental justice.
6. I fully support requiring exempted vehicles to comply with all State and local laws, including authorization to operate upon all roadways traversed.
7. I support the requirement that any applicant maintains ownership and operational control over the Origin for the lifespan of those vehicles. However, the terms and conditions

applied should be transferrable to another owner if the exempted vehicles transfer to a party that was not the original applicant. NHTSA should have the right to impose all requirements on the new party, including verification that all conditions are met before the exempt vehicles can operate on any public roadway.

8. I fully support a public-facing and internal reporting system.
9. I have no additional information to provide regarding safety data.
10. NHTSA should require data reporting for at least the two-year exemption period. The agency should ensure that the data be used to craft regulations that promote the development of this industry.
11. In the long-term, the agency should work with manufacturers and vehicle operators to create a data sharing standard that would strike a reasonable balance between data size and ability to use the data (see the Mobility Data Specification).
12. My research into shared autonomous electric vehicle fleet operations looks at dispatch strategies that reduce congestion, improve the percent of requests met within a 15-minute waiting period, and align charging with renewables and low-carbon power sources. I have found that fleets are self-motivated to pursue strategies that reduce societal damages because they increase profitability and serve more riders.

    The decongestion benefits from these vehicles increase when cities impose ODD restrictions that geofence the fleet to high-demand regions and when the fleet allows for ride-sharing (i.e., sharing the vehicle with strangers). Removing the driver from ride-hailing can lower per-mile costs significantly, and on-demand trips would be more affordable. On the other hand, increased affordability in on-demand rides increases the number of trips (and miles) that otherwise would not have been taken. Although this increases transportation energy use, shifting to electric vehicles, sharing rides, and sharing vehicles (less embodied emissions) can improve conditions for everyone. At the same time, reducing household transportation costs and improving affordable mobility options may improve the economy by increasing foot traffic at destinations.

    The health and climate benefits of increasing electric vehicle adoption are widely known. The extent of benefits depends on whether the fleet pays retail or wholesale electricity prices and in the case of retail prices, whether there are time-of-use rates and a peak demand charge. Recent work under review studies how a cost-sensitive approach that minimizes direct electricity costs and indirect (health and climate effects from marginal emissions) costs can improve upon price-agnostic vehicle dispatch strategies. The magnitude of per-vehicle savings increases when the costs of producing power are passed directly to the fleet, provided that the fleet can plan their day using day-ahead prices, which are publicly available. Given the effort to decarbonize grid feedstocks and improve the aging electrical grid, I believe that utilities and state commissions may allow EV fleets to pay wholesale power prices because they reward charging during off-peak periods and lowers energy costs for all.
13. The fuel efficiency of ADS technologies will depend on auxiliary loads (e.g., heating and cooling), “mission critical” (sensors and computational equipment), and dispatch decision-making, with the last two being the result of confidential information. If NHTSA adopts a condition, I propose only requiring aggregate-level information. California’s Clean Mile Standard could be adopted here to understand empty mileage and average vehicle occupancy without creating a burden from having different metrics.

14. NHTSA should ensure that exempted vehicles comply with applicable ADA requirements and require the quarterly safety report include all relevant complaints made by people with disabilities. NHTSA can and should seek to incorporate findings from the US. DOT Inclusive Design Challenge into FMVSS that regulate ADS-equipped vehicles. I believe that State and local authorities with jurisdiction to impose and change ADS/ODD requirements should design accessibility goals that meet the needs of the community.
15. I believe that ADS-equipped vehicles designed to operate like a taxi/ride-hail company should follow accessibility and equity requirements that licensed taxi companies follow. If this industry *truly* increases accessibility in underserved communities, State and local communities have a responsibility to require that non-ADS-equipped vehicles providing passenger service be held to an improved standard that the exempt vehicles can provide.
16. NHTSA should consider the economic benefits from an increased number of affordable on-demand trips and the impacts on American manufacturing jobs. NHTSA should consider how granting exemptions to the Origin may help advance US electric vehicle supply chains.