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Dr. Steven Cliff
Administrator of National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
West Building
Washington, DC 20590

Dear Administrator Cliff:

My name is Dr. Kara Kockelman, and I am the Dewitt Greer Centennial Professor of Transportation Engineering at The University of Texas at Austin's (UT's) Department of Civil, Architectural and Environmental Engineering.

I have been a UT transportation engineering professor for 24 years, and my research emphasizes the safety, emissions, traffic, community welfare, and other impacts of distinctive transportation investments, policies, designs, technologies, and practices. I have published over 200 archival journal articles with my terrific students, including globally recognized work on shared, electric, and self-driving vehicles; travel demand forecasting; crash outcomes; US and regional system simulations; cost-effective interventions; and related topics. Pre-prints of those papers, along with 25+ book chapters and 2 books can be found here:

<https://www.cae.utexas.edu/prof/kockelman/home.html>.

I am writing to voice **very strong support of GM and Cruise's request for temporary exemptions** consistent with the Vehicle Safety Act, NHTSA guidance, and applicable law for certain requirements of Federal Motor Vehicle Safety Standards (FMVSS). If this Petition is granted, GM and Cruise will deploy a dedicated fleet of fully autonomous, all-electric ridesharing Origin vehicles, or what I have long called "SAEVs" (for shared, fully-automated, all-electric vehicles). This is key step toward providing life-saving technology on US roadways, while using vehicles (and scarce lane-miles) much more efficiently and cost-effectively (by filling seats with those willing to share rides) while reducing vehicle emissions and achieving more inclusive, cost-effective and accessible transportation options for the public at large.

Congestion costs are close to \$1,000 per year per American (1), and US crash costs are close to \$3,000. Again: \$3,000 per capita, per year, from roadway crashes alone. Even with COVID's work-from-home impacts, most Americans still experience travel delays daily, and "minor" traffic crashes every 5 to 10 years (with about half the nation's property-damage-only crashes going unreported). Demand for roadspace continues rising, as a lack of high-density, infill development pushes more households to the periphery of our already sprawling regions. Widescale congestion will only continue as we make "driving easier", through automated

vehicles. Without real-time/dynamic ride-sharing of seats in vehicles like the Origin, and possibly congestion pricing of all near-bottlenecks, we can easily find our nation's heavily used corridors and networks totally gridlocked at many times of day in the coming years. We need manufacturers willing to produce and deploy cost-effective sustainable systems now. GM and Cruise are offering that. Please, let us take them up on that offer, now.

The average passenger vehicle's ownership/depreciation, registration and insurance cost us over \$15 per day, and most household vehicles sit idle over 95% of the time, many on high-value real estate (in the midst of an enduring national housing crisis) resulting in a dramatically inefficient use of urban, suburban, and exurban space (2). Our estimates of the collective US benefits of time savings and collision reduction from a shift to autonomous vehicles (AVs) is expected to reach \$1.2 trillion per year, or roughly \$3,800 per capita – per year, if congestion does not gridlock us (3). Granting exemptions for the Origin will help such benefits emerge, while enabling the US to remain a leader in this critical space. Such benefits speak directly to the economic growth topics that NHTSA and other federal agencies regularly raise.

Furthermore, Origin users will benefit from various operational processes (like the vehicle's "Buckle to Ride" policy) that improve transport safety, alongside regular maintenance and systems-oversight practices that come from coordinated fleet management rather than private, household ownership (where formal safety checks come once a year, if at all).

The Origin is also purpose-built to be shared, seating up to six passengers. This design is not simply for shared vehicles (like a taxi might be), but decisively shared rides – en route, among "strangers". In combination with proactive fleet management protocols, SAEV systems like GM/Cruise's Origin can achieve significant reductions in single-occupant vehicles and roadway congestion. They can be required to obey speed limits and other rules that privately held vehicles and their drivers regularly neglect, while offering cost savings that no one else can match. Our detailed microsimulations of shared AV (SAV) systems in a wide variety of realistic use cases, across distinct US networks (like Chicago's 20-county region, the Twin Cities' 7 counties, Austin's 5 counties, the City of Bloomington, and now the DFW Metroplex), suggest that 1 SAV can replace from 7 to 10 conventional, household vehicles, while lowering access costs on all trips made. SAEVs make travel time much more productive for those who formerly drove, while improving the welfare and air quality of our communities. Such services can be on-demand or reserved ahead, door to door or between pickup and dropoff points, serving local transit stations and going between cities (e.g., 4, 5, 6, 7, 8).

Furthermore, the Origin's design as a zero-emission vehicle (ZEV) helps get this environmentally efficient technology into the hands of lower-income households and those that will not be seeking a new vehicle for many years, without having to invest in a charger or seeking out charging stations en route. Our estimates of SAEV system costs, including all DC fast-charging stations, and recognizing empty-travel between riders and to and from stations, come to just \$0.60 per revenue vehicle-mile, or \$0.15 per seat-mile (when vehicle is occupied). The Origin lowers these costs further, by offering 6 seats instead of the 4 we typically simulate. And all simulations suggest dramatic cost reductions over the \$1.50 to \$2.00 per passenger-mile-served (!) cost that US transit service has long required. Cruise can help usher in a new system of public transit for our nation, with agencies' current subsidies serving 10 times the population, at

far less travel time, in a demand-responsive fashion we have never experienced. Such services can free up parking spaces for much more meaningful uses (like extended sidewalks, bike paths, and shuttle lanes, parklets and automated-truck delivery stations, low-cost housing, and new mixed-use developments).

Cruise's combination of shared and electric vehicle design is foundational to unlocking automation's environmental and community benefits. In response to NHTSA's question and as echoed in the Origin's design, all AVs *should* be using electric drivetrains, to lower our nation's exposure to diesel's fine particulate matter (PM2.5) while greatly moderating the evolving climate disaster that fossil fuels have unleashed. Our work on smart charging of SAEVs (to minimize power costs, protect the grid, and maximize renewable feedstock use) plus optimal EV charging station placement (for long-distance and local trips, in different US settings) highlights the viability of such strategies for an industry-wide transition (e.g., 9, 10, 11).

The Origin is the next step in our journey to a world with zero crashes, fewer emissions, and less congestion, at lower-cost, better access, greater equity and more convenience for all. Enabling the development of this technology at scale is a dramatic and important step forward in ensuring that the United States is able to achieve its goals for cleaner, safer, and more inclusive mobility. The Origin's mission clearly aligns with the public interest. I am delighted Cruise and GM are taking the lead, along with Waymo and others, and I urge NHTSA to approve GM and Cruise's petition for exemptions to produce the Origin. The more of these vehicles we can be using, and the sooner we can be using them, the better.

Thank you for the opportunity to voice my **strong support for this petition**. Please do not hesitate to let me know if you have any questions regarding or suggestions for my continued work in this important space.

Sincerely,



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Please see <https://www.caee.utexas.edu/prof/kockelman/home.html> for more AV- and SAEV-related publications and pre-prints.