September 18, 2020

Texas House of Representatives  
Committee on Transportation  
P.O. Box 2910  
Austin, TX 78768

Re: Notice of Formal Request for Information, Interim Charges 1-5

Dear Chairman Canales,

I am writing in response to the Committee on Transportation Notice of Formal Request for Information on Interim Charges 1-5. We welcome the opportunity to provide commentary on Interim Charge 3: Autonomous Vehicles, and recommendations to further strengthen the favorable autonomous vehicle regulatory regime in the state.

Nuro has been operating an autonomous delivery service in Houston for nearly two years, and we look forward to continuing to expand our operations in the state. We are the first company in the nation to operate a grocery delivery service using unmanned autonomous vehicles on public roads. Since we launched our service, Nuro autonomous vehicles have completed thousands of deliveries of essential goods like groceries and medicine in partnership with Kroger’s and CVS Pharmacy. While we have always believed that autonomous delivery vehicles would improve road safety and provide valuable convenience to consumers, we did not foresee our service helping to keep Americans safe from contagion. But the COVID-19 pandemic has expedited the public need for contactless delivery services. In recent months, we have seen significantly increased demand for this service in recent months, and we partnered with the Houston Food Bank to help bring food to our neighbors in need.

Nuro is committed to developing autonomous vehicles because of their potential to make our roads safer. We design, build, and operate fully autonomous, on-road vehicles, custom designed to deliver goods quickly, safely, and affordably. Because autonomous vehicles never get distracted or impaired, see 360-degrees around, and can be programmed to consistently follow the rules of the road, they can help address the 37,000 fatalities that occurred on our public roads last year. Zero-occupant vehicles (ZOVs) like Nuro’s present additional opportunities to improve safety, including removing any occupants from harm’s way and redesigning the vehicle to keep what’s outside safer than what’s inside. These safety advances are only possible with the introduction of autonomous driving technology.
At the same time, autonomous vehicles are reducing congestion and pollution on Texas roads, supporting significant economic growth and new jobs, and can provide many more Texans with access to goods. Autonomous delivery vehicles can replace many of the 43% of all car trips that are for shopping or other errands with a smaller, lighter, zero-emission vehicle capable of carrying multiple orders at once. In the process, our retail partners are hiring new workers to pick-and-pack orders, while Nuro invests in a talented workforce to design, build, and maintain these vehicles in the United States. These vehicles can then bring all kinds of goods — from groceries to medicine — to customers, saving them time and providing access to Texans who cannot drive, lack access to a car, or live in food deserts.

**Economic and social benefits of delivery AVs**

The benefits of autonomous vehicles are particularly vivid in the delivery use case. A new study released last week by the transportation economists at the Steer Group, “Economic Impacts of Autonomous Delivery Services in the US,” found that delivery AVs like Nuro’s could bring communities substantial economic and social benefits. Considering all delivery AVs, Steer projects that from 2025-2035, Americans could use AV delivery services instead of personal vehicles for much of their daily shopping and errands. They project that nationally, these services will:

- **Create new jobs**: create and sustain 3.4 million jobs annually — from fleet operators and pick-pack workers in retail, to more technical software and hardware engineers. For comparison, there are currently 3.2 million public school teachers in the U.S.

- **Stimulate local economies**: generate $1.1 trillion in investment from AV delivery companies, suppliers, and retail partners over the 10 year period, which will generate an estimated $4.1 trillion in total value to the U.S. economy. That is more than the total $3.5 trillion in economic activity from oil and gas extraction over the last decade.

Analyzing the potential social benefits of this technology specifically for Texas, Steer projects that delivery AV services will:

- **Reduce crashes**: Avoid 34,000 severe road collisions, which would reduce injuries by ~48,000 and help prevent ~700 Americans from dying in car crashes.

- **Decrease emissions**: Reduce CO2 emissions by 57 million tons.

- **Give people time**: Save Texans 3 billion hours of driving to and from the store. That is the equivalent of every user recouping 96 hours annually.

**Recommendations for optimizing state policy**

The rapid growth in our service over the last two years was enabled by the responsible regulatory framework for autonomous vehicles defined by the legislature in 2017. Through
collaboration with the Texas Department of Transportation, Department of Motor Vehicles, the City of Houston, and local law enforcement and first responders, we have been able to stand up our business and work through any ambiguities in the current statute. However, our experience operating in-state highlights a few incremental updates the legislature can make to existing regulations to improve regulatory certainty and allow for the responsible deployment of autonomous vehicles on Texas roadways.

**Vehicle Code Equipment Requirements**

We recommend the Committee review existing vehicle code, and update the current autonomous vehicle statute to clarify that dedicated autonomous vehicles and ZOV’s may operate in the state without equipment otherwise required by code when it is not necessary for vehicle operations (e.g., brake pedals, windshields, wipers, speedometers, for dedicated AVs, along with occupant protection equipment like seat belts for ZOVs that will never have a human inside them).

Multiple manufacturers now build purpose-built AV’s with no ability for human control (Zero Occupant Vehicles for delivery) or with no ability for a human passenger to intervene in the dynamic driving task (for autonomous passenger service). In these vehicles, there is no useful application for equipment on vehicles that allow for human control of the dynamic driving task. Most states, including Texas, have equipment requirements in their vehicle code, including items like brake pedals, mirrors, and windshield wipers — which serve no purpose on a ZOV.

**Vehicle Inspections**

We recommend the Committee review current inspection requirements in the vehicle code, and update the autonomous vehicle state to clarify how vehicle inspections should apply to dedicated autonomous vehicles and zero-occupant vehicles.

Currently, the Texas Department of Motor Vehicles requires a vehicle inspection at the time of registration and titling. As noted above, a purpose built AV could be inspected for equipment that has no safety purpose.

**Remote Operations**

We recommend the Committee review how remote operations of autonomous vehicles function as an added layer of safety, and explicitly authorize AV operation with such systems. Many manufacturers currently utilize an autonomous driving system that incorporates remote operations capabilities as a safety fall-back. These systems can cause a vehicle to come to a safe stop if necessary, or assist in navigating novel situations without delaying other road users. In most states, this is either explicitly required in order to operate an autonomous vehicle on public roads, or clearly allowed in regulations. Currently, Texas regulations do not address remote operations of autonomous vehicles.
Low Speed Vehicle Operations

We recommend the Committee review existing laws for Neighborhood Electric Vehicles and consider ways to allow for increased road access for slow moving vehicle operation in limited circumstances. This access could be provided in a safe and limited fashion by restricting the applicable roadways and operating conditions.

Many autonomous vehicle operators currently operate their vehicles at speeds of no more than 25 mph to ensure safe operations. However, this limits the road network these autonomous vehicles can access, restricting the potential reach of autonomous delivery (e.g., for people in food deserts and more rural communities).

Thank you for the opportunity to comment on this Interim Charge. We look forward to continuing to work with you and the Members of this Committee to advance the benefits of autonomous technology in the State of Texas.

Sincerely,

Aidan Ali-Sullivan
Lead, State Policy