NSPE® NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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May 14, 2019

U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE, West Building Ground Floor, Room W12-140
Washington, DC 20590-0001

RE: The National Society of Professional Engineers' Public Comments on Docket ID No. NHTSA-2019-0017-0001, Nuro, Inc. – Petition for Exemption for an Electric Vehicle with an Automated Driving System

On behalf of the more than 31,000 members of the National Society of Professional Engineers, these comments are submitted in response to the National Highway Traffic Safety Administration's request for public comment on Nuro, Inc. – Petition for Temporary Exemption for an Electric Vehicle with an Automated Driving System.

As stated in NSPE's *Autonomous Vehicles: A Public Regulatory Policy Guide*, "licensed professional engineers should play a critical role as part of the autonomous vehicle design and manufacturing process…."[i] Historically, professional engineers have been deeply involved in the safe development and deployment of new and emerging technologies. Because professional engineers have an ethical duty to protect the public, they are uniquely positioned to help usher in new technology while prioritizing public safety.

It is with this role in mind that the National Society of Professional Engineers urges Nuro, Inc to utilize the subject matter expertise of Professional Engineers in the design, construction and deployment of its R2X and any subsequent autonomous vehicles.

In reviewing Nuro, Inc's petition for exemptions dated October 19, 2018, the requested exemptions appear reasonable, given the intended use of the R2X autonomous vehicle. However, Nuro's petition lacks some crucial details, which is cause for concern.

First, while Nuro thoroughly addresses how the R2X will interact with pedestrians, as well as how it will protect pedestrians should a collision occur, the petition lacks detail with regards to its interactions with human drivers. The petition mentions "objects," but appears to reference only static object. Are there additional safeguards for moving objects like cars and bicycles? NHTSA should require more detail from Nuro, Inc. about the R2X's response time and reactions to objects that are moving.

In addition, Nuro's petition lacks information regarding ethical decision-making. Nuro states that the R2X is built to minimize harm on a pedestrian should a collision

be unavoidable. But, in a scenario in which avoiding injury to one individual would likely result in injury to another, how does the R2X choose its response? Ethical training for the remote operator also needs to be explained, as it is possible that a remote operator, tasked with monitoring several vehicles, could be faced with a similar decision, or have more than one vehicle requiring intervention. NSPE strongly recommends requiring Nuro, Inc to develop and make public both a risk assessment and an ethics compliance disclosure similar to those on pages 3 and 4 in NSPE's autonomous vehicle policy guide.

Under "Safety – Performance of the ADS," NHTSA asks for information about the ADS' ability to function in a scenario it cannot handle. From the petition, it is NSPE's understanding that an operator will step in and take over for the ADS system as a back-up. If NSPE's interpretation of the report is incorrect, Nuro needs to provide more detail on how the ADS system would act to minimize safety risks in a scenario it cannot handle. If it is the case that an operator will step in, NSPE recommends that NHTSA require a risk assessment and ethics compliance disclosure for the operators as well, detailing steps a human operator would take to mitigate any public harm.

In Question 17, NHTSA asks if Nuro, Inc provided sufficient detail about "pedestrian detection and mitigation strategies." While Nuro does provide detail regarding pedestrians, as stated earlier in NSPE's public comments there is not sufficient information regarding detection of objects, especially objects that are moving. How would the R2X function if, for example, a small child darts onto the road from the passenger side of the vehicle as a school bus is approaching from the driver's side? Details regarding the interaction of pedestrians and moving objects are not given in Nuro's petition and should be clarified before Nuro's exemption request is granted.

Question 19 relates back to NSPE's earlier comments on the need for an ethical decision-making framework. In order for Nuro to move forward with its testing of the R2X, NSPE recommends Nuro be required to create an ethical decision-making process for the R2X's prioritization of the safety of other road users.

Question 21: while NSPE believes the R2X safety features are sufficient for protecting the safety of pedestrians in the environment in which the R2X would be deployed, those safety features would need to be reviewed and augmented if the R2X environment were to change.

Finally, question 29 asks about Nuro's planned cyber-security. The described security measures in Nuro's petition are insufficient, given the increase of cyber-security threats and the severe injury that could be caused by an R2X or other autonomous vehicle that has been hacked. NSPE strongly recommends that NHTSA withhold approval of Nuro's exemption request until a more detailed cyber-security plan is

submitted. (See Recommendation 8: Security, on page 6 of NSPE's autonomous vehicle policy guide.)

Should Nuro, Inc address the concerns detailed in NSPE's public comments, the organization would support granting a limited exemption for public testing of R2X vehicles.

NSPE greatly appreciates this opportunity to provide comment on Nuro, Inc.'s exemption petition. Any further questions, please contact Stephanie Hamilton, government relations manager, at shamilton@nspe.org.

Sincerely,

Michael Aitken,
PE, F.NSPE President

Cc: NSPE Board of Directors

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[i] https://www.nspe.org/sites/default/files/resources/pdfs/Autonomous-Vehicles-A-Public-Regulatory-Policy-Guide.pdf