

**DEPARTMENT OF TRANSPORTATION**

**AGENCY:** Office of the Secretary of Transportation (OST), Department of Transportation

**Request for Information (RFI) for the Inclusive Design Challenge**

**DOCKET NUMBER:** DOT-OST-2019-0187

**ACTION:** Request for information (RFI)

**SUMMARY:**

The U.S. Department of Transportation (DOT) Office of the Secretary of Transportation (OST) is seeking feedback on a proposed inclusive design challenge (Challenge) via this Request for Information (RFI). The Challenge is intended to incentivize creation of innovative, inclusive design solutions to enable access to automated vehicles (AV), also known as Highly automated Vehicles (HAV), for persons with disabilities. The Challenge seeks to emphasize the opportunities and challenges introduced by AVs which human occupants are not expected to drive, nor supervise the driving functions of the automated system, or perform any other element of the dynamic driving task as long as the vehicle remains within its operational design domain.[1]

The Challenge will solicit solutions addressing obstacles faced by persons with physical, sensory, and/or cognitive disabilities. The goal of the Challenge is to inspire inclusive designs as AVs are developed, which may also increase access to conventional vehicles today. Solutions proposed should aim to decrease the need to modify Level 4 and 5 AVs post- production, or to reduce the cost of retrofitting AVs for use by persons with

disabilities, including wheelchair users.<sup>[2]</sup>

**DATES:**

Responses to the RFI must be received by January 31, 2020, no later than 5:00 p.m. (ET).

**ADDRESSES:**

Written comments may be submitted using any one of the following methods:

- Electronic mail: Email comments to [inclusivedesign@dot.gov](mailto:inclusivedesign@dot.gov). Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and be no more than 5 pages in length, with 12-point font and 1-inch margins.
- Internet: To submit comments electronically, go to the Federal regulations Web site at <http://www.regulations.gov>. Follow the online instructions for submitting comments.

Respondents may answer as many or as few questions as they wish.

DOT will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

Respondents are requested to provide the following information at the beginning of their response to this RFI:

- Company / institution name
- Company / institution contact
- Contact's address, phone number, and email address

**FOR FURTHER INFORMATION CONTACT:**

The monitored inbox at [inclusivedesign@dot.gov](mailto:inclusivedesign@dot.gov). You may also contact David Carter, Office of the Under Secretary, OST (202-366-4813). You may send email to Mr. Carter at [david.carter@dot.gov](mailto:david.carter@dot.gov).

**SUPPLEMENTARY INFORMATION:**

The purpose of this RFI is to solicit feedback from academia, research laboratories, industry, government agencies, and other stakeholders on the scope and ideal outcomes of the Challenge. DOT is interested specifically in information on how best to structure a multi-phase prize competition to attract novel systems that use design solutions to enhance accessibility in AVs.

**Background**

DOT is eager to realize the potential mobility benefits that AVs could bring to persons with disabilities. However, DOT also recognizes that this is not an easy problem to solve and there is no single solution. The wide diversity of disabilities and resulting needs for inclusive vehicle designs increase the complexity of the engineering challenge. While some mobility services (e.g., transit vehicles and service, and other for-hire vehicles, such as taxis) currently incorporate some accessibility features, few such features have been universally included in passenger vehicles. Existing solutions, particularly to enable access to and use of vehicles by

wheelchair users, typically are added through aftermarket modifications, which can be expensive and cumbersome for persons with disabilities, rather than integrated as original equipment.

Automated vehicles introduce new design opportunities, particularly to enable independent use by persons with physical, sensory, and/or cognitive disabilities. By using the challenge format, DOT seeks to draw attention to the topic of passenger vehicle accessibility; encourage new cross-disciplinary collaborations; incentivize the development of new approaches and technologies to help people move independently; and tap into the creativity and knowledge of the disability community, researchers, advocates, manufacturers, and entrepreneurs.

DOT aims to attract ideas from around the nation to identify new solutions for common access issues. The Challenge is expected to be open to individuals and teams (Designers) from the academic, research, and business communities, including but not limited to universities, research institutions, technology companies, and entrepreneurs. As with other government competitions, the Challenge aims to create a vibrant community of thinkers and doers who drive revolutionary innovation. As such, DOT encourages teams to organize themselves in a manner that best allows them to meet the Challenge. DOT expects teams to describe how they have engaged with stakeholders to understand the needs and constraints of both industry and travelers with disabilities when explaining the feasibility and impact of their design. DOT also encourages teams to identify representatives from both industry and the disability advocacy community to serve as advisors and to help inform the direction of their ideas based on their knowledge and expertise.

### **Challenge Features**

Through the Challenge, DOT seeks innovative ideas and design solutions to enable persons with disabilities to use AVs independently and ultimately to create a more accessible transportation future for all. Designers will compete for cash prizes by developing innovative design solutions to increase access to, and reduce the cost of building and/or modifying AVs for use by, persons with physical, sensory, and/or cognitive disabilities. Successful solutions will demonstrate consideration of production feasibility.

DOT expects to consider the following factors in the Challenge in evaluating design solutions that aim to both propose future vehicle designs and create components in support of inclusive design features.

- **Vehicle Platform**: All design solutions should be targeted toward integration into light duty passenger vehicles. Solutions may address any vehicle manufacturing stage (aftermarket modification and purpose-built).
  
- **Vehicle Use**: For the Challenge, design inclusiveness will be evaluated in part based on the extent to which proposed solutions enable each element of vehicle use, as outlined below. Designers will develop inclusive design solutions to address one or more of the following tasks that an AV user with a disability will need to complete independently:
  - Locating an AV – Including, but not limited to, being notified that a vehicle has arrived; identifying the correct vehicle and locating and navigating to the correct vehicle.
  - Entering an AV – Including, but not limited to, unlocking and opening vehicle door(s); deploying and stowing ramps or other equipment enabling access for wheelchair users or persons with other physical disabilities or mobility

equipment; and closing vehicle door(s).

- Securing Passengers and Mobility Equipment – Including, but not limited to, securing seatbelts and other passenger restraints; securing wheelchairs or other mobility equipment to the vehicle; and securing service animals.
  - Inputting Information – Including, but not limited to, confirming passenger identity; searching for, entering, and changing a desired destination; confirming the vehicle’s destination; selecting a specific drop-off point (e.g., a particular entrance to a large complex or a location with a curb cut or sufficient space to deploy a ramp or other physical device).
  - Interacting with the vehicle in routine and emergency situations – Including, but not limited to, operating passenger convenience and safety features (e.g., entertainment, window controls, locks, climate control); monitoring the vehicle’s location and route progress; changing the vehicle’s destination enroute; requesting assistance (emergency or non-emergency); understanding and performing appropriate actions in the event of a breakdown or crash.
  - Exiting an AV – Including, but not limited to, being notified and confirming that a vehicle has reached its intended destination; releasing passenger and/or mobility equipment restraints; identifying and locating the safe and appropriate door(s) from which to exit the vehicle; recognizing when it is safe to exit a vehicle; opening door(s) and deploying and stowing ramps or other equipment enabling access for wheelchair users or persons with other physical disabilities or mobility equipment.
- **Disability Types**: For the Challenge, inclusiveness will be evaluated in part based on the

extent to which proposed solutions address a range of disabilities and needs. Designers will also focus their efforts by designing solutions for use by one or more of the following audiences:

- Persons with physical disabilities
- Persons with sensory disabilities
- Persons with cognitive disabilities

### **General Structure of the Prize**

The Challenge is expected to consist of two stages. Individuals/teams will compete for an overall prize purse of up to \$5,000,000. The prize purse is part of the \$100 million provided in FY 2018 to the Federal Motor Carrier Safety Administration for a HAV research and development program. In Stage I, up to 15 semi-finalists will receive \$100,000 each for developing promising concepts. In Stage II up to four Stage I Designers will move on to be named finalists and receive a portion of the remaining prize purse, including a potential grand prize of \$2,000,000.

- **Stage I, Ideation**: In Stage I, all eligible Designers will submit proposals for ideas to develop inclusive design solutions for AVs. Up to 15 semifinalists will be selected to advance to Stage II to develop a functional prototype of their idea and compete for a cash prize. If a selectee declines to participate in the next stage, an alternate may be selected.
- **Stage II, Prototype/Demonstration**: In Stage II, the semi-finalists from Stage I will develop their concepts into functional prototypes (i.e., detailed system designs and prototypes to be demonstrated) for an inclusive design solution. DOT anticipates that partway through Stage II one or more design charrettes will be held subject matter

experts from industry and the disability community. At the end of Stage II, teams will be invited to Washington, D.C. to demonstrate their prototypes. After this the final prize selections will be announced. A travel stipend will be provided to teams for travel to Washington, D.C., for the charrette(s) and demonstration. Up to four finalists will be selected and awarded a portion of the remaining prize purse, contingent upon review of the Stage II submissions and demonstrations against the evaluation criteria.

### **Disclaimer and Important Notes**

This is solely an RFI and **not** a Notice of Funding Opportunity or the opening of a challenge competition. Therefore, DOT is not accepting applications at this time. DOT may issue a prize in the future based on or related to the content and responses to this RFI; however, DOT may also elect not to issue a prize. There is no guarantee that a prize will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential applicants if DOT chooses to issue a prize regarding the subject matter. Final details, including the anticipated award size, quantity, and timing of DOT funded awards, will be at the discretion of the Secretary of Transportation.

Any information obtained as a result of this RFI is intended to be used by the government on a non-attribution basis for planning and strategy development; this RFI **does not** constitute a formal solicitation for proposals or abstracts. Responses to this notice will be treated as information only. DOT will review and consider all responses in its formulation of program strategies for the identified materials of interest that are the subject of this request. DOT will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that DOT is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to



this RFI do not bind DOT to any further actions related to this topic. DOT may use or disclose responses for any lawful purpose.

### **Proprietary Information**

Because information received in response to this RFI may be used to structure future programs and/or otherwise be made available to the public, respondents are strongly advised to NOT include any information in their responses that might be considered business sensitive, proprietary, or otherwise confidential. However, respondents may choose to include such information in their submissions if they believe it will significantly assist DOT in the design of the Challenge.

Responses containing confidential, proprietary, or privileged information must be conspicuously marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act, 5 U.S.C. § 552.

If a response contains trade secrets or confidential commercial or financial information, the respondent must include a cover sheet identifying the specific pages containing that information. The cover sheet must also provide evidence that the respondent actually or customarily treats the information as private.

In addition, the respondent must (1) mark the header and footer of every page that contains trade secrets or confidential commercial or financial information with “Contains Confidential Information Exempt from Public Disclosure” and (2) identify every line and paragraph containing such information with double brackets or highlighting.

## **Evaluation and Administration by Federal and Non- Federal Personnel**

Federal employees are subject to criminal prosecution for the unauthorized disclosure of appropriately and properly marked confidential information under 18 U.S.C. § 1905. The government may seek the advice of qualified non- federal personnel and use non- federal personnel to conduct routine, nondiscretionary administrative activities. Submissions may be reviewed by support contractors and private consultants. By submitting your response, the respondent consent to DOT providing it to non- federal parties. Non- federal parties will be obliged to maintain the confidentiality of any submissions prior to being given access to those submissions.

## **Request for Information**

### **Category 1: Challenge Topic and Design**

1. The Challenge could address elements of independently using a passenger vehicle, as described above. Are crucial elements missing? If so, please describe the missing element(s) and discuss how they create challenges for independent travel.
2. Is there benefit to including an option for the development of a full concept design for inclusive vehicles (i.e., in reimagining the vehicle design)? If so, please explain why and describe what requirements should be considered as part of this concept proposal.
3. How can proposals account for uncertainty in the development path of automated vehicles while still demonstrating novel and realistic concepts for inclusive design?
4. Stakeholder engagement is an important aspect of the Inclusive Design Challenge. In what ways should DOT continue stakeholder engagement throughout the project to

support teams in receiving valuable feedback on their designs (e.g., expert panels, public webinars that solicit feedback etc.)?

5. Are Stage I awards sufficient for enabling the development of a prototype for Stage II?
6. Do the proposed Challenge background, purpose, and challenge features sections above provide sufficient information to inform proposals? If not, what additional information would be helpful?

### **Category 2: Evaluation**

1. How can DOT evaluate proposals on the basis of:
  - a. Inclusiveness?
  - b. Production feasibility?
  - c. Expected user experience?
2. What evaluation criteria are most important when considering how proposals can best enable access to AVs for persons with disabilities:
  - a. Description of how the proposed solution contributes to independent travel
  - b. Demonstration of a realistic understanding of users and their unique needs
  - c. Demonstration of the engineering needs and explaining how the team arrived at that determination of need
  - d. Determination of the potential cost and manufacturability
  - e. Thorough description of the user experience when the technology is implemented
  - f. Consideration of the human-machine interface needs both inside and outside of the vehicle

- g. Consideration of a range of needs and limitations, including users in a range of geographic contexts, income brackets, and with and without access to a smartphone or bank account
  - h. Other criteria
3. How would evaluation criteria be different if there were two types of proposals being considered (such as components and full design)?

### Footnotes

1. Dynamic Driving Task and Operational Design Domain are both defined by SAE International in standard J3016: Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles ([https://www.sae.org/standards/content/j3016\\_201806/](https://www.sae.org/standards/content/j3016_201806/))
2. See SAE International standard J3016: Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles for definitions of driving automation levels ([https://www.sae.org/standards/content/j3016\\_201806/](https://www.sae.org/standards/content/j3016_201806/))

Issued On:

Finch Fulton,

Deputy Assistant Secretary for Transportation Policy.