Consumer Technology Association™

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BY ELECTRONIC SUBMISSION

Docket Management Facility
U.S. Department of Transportation
West Building Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590-0001

Re: **Request for Comments on The Manual on Uniform Traffic Control Devices for Streets and Highways Docket No. FHWA-2020-0001**

Dear Sir or Madam:

The Consumer Technology Association ("CTA")® welcomes the opportunity to submit comments on the recent circulation of the Federal Highway Administration's ("FHWA") *The Manual on Uniform Traffic Control Devices for Streets and Highways* ("MUTCD") *Revisions,* Docket No. FHWA-2020-0001. CTA represents the $422 billion U.S. consumer technology industry, which supports more than 18 million U.S. jobs. Members of CTA are at the forefront of bringing self-driving vehicle ("SDV") and smart city innovations to America's roadways, including vehicle and component manufacturers, software developers, transportation platforms, security companies, and companies engaged in a multidisciplinary approach to this emerging and growing industry. CTA is also the owner and producer of CES®, the world's most influential tech event and proving ground for breakthrough technologies and global innovators.

Self-driving vehicles have the power to transform our society. First, safety is paramount, as 94 percent of U.S. crashes involve human error. And approximately 36,000 vehicle-related deaths happen each year in the United States alone. Self-driving vehicles hold the promise to one day help prevent these fatal crashes, save lives, and reduce crash severity. But the societal benefit goes beyond safe public transportation. These technologies promise to improve mobility for underserved communities—including people with disabilities and older adults—and reduce traffic congestion. These technologies will also increase efficiency and productivity, boost our economy, and create millions of jobs.

CTA supports efforts by the U.S. Department of Transportation ("USDOT") to ensure the current regulatory framework encourages innovation and adoption of smart city technologies and self-driving vehicles. CTA appreciates the opportunity to comment and is encouraged by the USDOT's willingness to adopt rules that consider new technologies. CTA applauds FHWA for developing the framework in anticipation of increased SDV and smart city activity in the future.

CTA research has defined a smart city as "a city that applies technology innovation to public administration of the city with the objective of responding faster, reducing costs and improving quality of services to citizens."[1] According to CTA, two-thirds of US cities are actively investing in smart city technology.[2] Smart city technologies are wide-ranging but can also include improvement to traffic signals, streetlights, and other innovations that may not be necessary for self-driving vehicles but can be helpful.

Advancements in SDV technology and the digitization of city infrastructure complement each other—developments in one fuel innovation in the other. Automated vehicles will benefit from smart cities by leveraging up-to-date data about traffic control devices and other road conditions. In addition to less congestion, smart cities benefit from the optimized use of space from SDVs (i.e., greener streets, multi-use public spaces).

SDVs extend beyond cities—self driving trucks (SDTs) can increase the safety and efficiency in the interstate highway system. SDTs can also revolutionize freight transportation—reducing costs and making the American economy more competitive. In addition to less congestion, smart cities benefit from the optimized use of space from SDVs (i.e., greener streets, multi-use public spaces).

Safety remains integral to the successful deployment of SDVs and smart cities. CTA supports the goal of eliminating traffic fatalities and serious injuries to pedestrians, bicyclists, and micro mobility users. Infrastructure improvements will enhance the safety, usability, and accessibility of the current transportation system.

Cybersecurity is also critical to ensuring SDV safety. CTA encourages the MUTCD to promote best practice cybersecurity techniques and processes that protect citizens' well-being and avoid malicious, deliberate safety-related incidents.

CTA encourages MUTCD revisions that promote technology neutrality. Embracing innovation is vital to the development of technologies and domestic jobs. Furthermore, technology neutrality is critical to maintaining global leadership and competitiveness in this industry.

[1] CTA, Smart City Research, "*Smart Infrastructure: Building & Mobility Solutions for Smart Cities.*" (2019)
[2] See, id.

Uniform rules and regulatory certainty are very important. This proceeding will assist the industry in knowing how to address new technologies. FHWA's adoption of a forward-thinking, yet comprehensive approach to policymaking would encourage continued stakeholder engagement, increased transparency, and promote innovation and U.S. competitiveness while upholding the primacy of safety.

SDVs benefit from the same things human drivers do:

i. Better lane lines
ii. Better roads (cracks can be confusing)
iii. More efficient construction zones
    1. Require more consistent and standardized construction patterns, including more predictable curvature/curvature limits
    2. Repaired lane lines in construction zones, even for short-term projects
    3. Fewer forced merges
    4. More standardized and consistent signage
    5. More signage
    6. Real-time construction information, portal, with API access
    7. Wider construction lanes (at least right lane)
iv. Curvature limits
v. More regular lane widths
vi. More consistent highway entrance/exit geometry
vii. Identifying/removing roadway debris
viii. Emergency vehicles
ix. Better spacing between lane lines and K-rails
x. Shoulders
    1. Clearer demarcation of the shoulder, including striping both the traffic and the non-traffic side.
        a. This helps to determine where a pullover is feasible. Stripe the end of the shoulder as well.

I. CTA encourages the MUTCD to continue prioritizing safety for motorists, pedestrians, bicyclists, and micro mobility users, while also modernizing standards to account for improvements in technology to better improve the goal of increased safety.

For years, the MUTCD has sought to increase safety for motorists, bicyclists, and pedestrians. The MUTCD must continue to evolve to meet new safety challenges and technological developments. Considering the alarming rise in pedestrian fatalities in the past decades, and the increased uptake of alternative modes such as bicycling and micro mobility, we urge USDOT to ensure that the MUTCD prioritizes the safety of vulnerable road users. Micro

mobility has become increasingly popular, and CTA encourages the MUTCD address this form of transportation.

CTA also encourages USDOT to adopt rules that unleash the potential of technology to provide a more robust and thoughtful transportation sector by adhering to certain criteria. And CTA encourages the FHWA to finalize the proposed changes for the MUTCD as soon as possible. FHWA should also consider more frequent updates to the document in order to remain concurrent with the deployment of advanced driver assistance and automated technology.

a. Technology Neutrality

Technology neutrality is incredibly important when considering how best to incorporate technology to improve safety. Prescriptive rules to prohibit certain types of technology from being included in the transportation space could lead to lost opportunities or unexpected outcomes.

b. Safety

Technology that might be adopted into the MUTCD must seek to improve safety. Safety is the most important goal of the MUTCD. Technology has immense opportunities to improve safety, but rules need to prioritize safety when thinking about how technology can be used.

c. Cybersecurity

Incidents of technology being exploited by criminals or rogue nations wishing to do harm, steal data, and/or seek financial gain continue to rise. Therefore, the cybersecurity of all technology adopted by the MUTCD needs to be carefully evaluated prior to deployment. Cybersecurity is an ever-evolving landscape, with new threats and vulnerabilities discovered daily. All technology adopted by the MUTCD must have continual cybersecurity support (e.g. monitoring and patching strategies) while the technology is in use.

d. Market Efficiency

Technology reduces costs across many different industries. Transportation also stands to greatly benefit from the use of technology. When identifying how to best provide revisions to the MUTCD, it is important to look at how technology can provide efficiencies and cost reductions. Infrastructure—which is incredibly expensive to maintain—can potentially see cost reductions by leveraging appropriate technologies.

e. Global Competitiveness

The USDOT should prioritize rules that promote U.S. competitiveness in the development of safety technology. U.S. activity in this space is important, not only for establishing uniform international rules when it comes to traffic and pedestrian safety, but also for our continued global innovation leadership.

The global leader in SDV development and deployment will gain tremendous economic benefits and high-skill jobs that automated vehicles produce. These advantages will range from the manufacturing of advanced sensors to the development of new artificial intelligence technologies, and in many more areas, as the industry evolves.

The overall market includes passenger vehicles, commercial trucking, last-mile delivery, and more. The USDOT recently funded a study showing that "Our model indicates that the adoption of driving automation will bring direct productivity enhancements to the long-haul trucking sector and (due to transportation's central role in the economy) produce secondary productivity enhancements to the larger macroeconomy. These productivity enhancements will increase GDP, capital, employment, wages, and welfare that can be monetized into billions of dollars."[3]

SDVs can also drive economic growth and improve quality of life through greater efficiency and increased mobility.

II. The MUTCD Revisions Should Reflect Practical Uses of Innovative Technology

The MUTCD has provided standards for safety across the country. Many traditional and future uses of technology can also be utilized to improve safety and efficiencies in transportation.

1. Smart traffic lights can be used to improve the flow of traffic and reduce congestion. They can also be used to reduce accidents with other motorists, pedestrians, and micro mobility users.

[3] "*Macroeconomic Impacts of Automated Driving Systems in Long-Haul Trucking*," a study funded by USDOT's Intelligent Transportation Systems Joint Program Office written by researchers from USDOT's Volpe Center and the Centre of Policy Studies at Victoria University in Australia.

2. Smart roads can be used to gauge how safe roads are for motorists by analyzing routine wear and tear. Smart roads can also notify local transportation agencies if repairs are needed, or alert motorists if damage to a road or hazardous conditions on the road are ahead.

3. Connectivity between roads, traffic lights, cars, bikes/scooters, and personal devices can also help reduce the cause of accidents and improve the flow of traffic. When technology is connected and communicating with each other, the safety and cost reduction yields are increased.

4. Smart parking can help drivers, particularly truck drivers, plan their routes and reduce overall congestion. A significant amount of traffic is caused by drivers looking for a place to park. Standardized approaches to data for available parking can help all drivers park quickly, with huge benefits to safety, congestion and emissions.

Artificial intelligence can predict where accidents might occur or where improvement in infrastructure is needed. While leveraged into existing uses of technology, such as cameras or sensors. Artificial intelligence can also be applied to predict, prevent and respond to cyber threats and attacks to ensure the safety of highways and cities.

In certain cases, the FHWA should also consider the harmonization and standardization efforts of other regions to support the development and deployment of driver assistance technologies and self-driving vehicles. For example, FHWA could assess the specifications of traffic control devices as defined by the Road Traffic and Road Signs and Signals Agreements and Conventions from the United Nations / UNECE. We would recommend that, when appropriate, the FHWA should harmonize related sign shapes, symbols or colors, as well as dimensions for road markings.

III. Rules on the Use of Technology

The central role of digital infrastructure in enabling smart cities demands the development of thoughtful federal policies to preserve the public trust. Cybersecurity applications need to be prioritized across the networked digital systems deployed in smart city infrastructure. CTA is a strong advocate for thoughtful and robust cybersecurity policies.

CTA is a leader in promoting IoT and device security. CTA, USTelecom and 13 other global information and communications companies, created the Council to Secure the Digital

Economy (CSDE). CSDE has produced substantive policy and technical documents to identify emerging threats in the IoT landscape. Specifically, CSDE has produced the International Botnet and IoT Security Guide, C2 Consensus on IoT Device Security Baseline Capabilities, and an IoT Security Policy Principles document, among other works. CTA has also produced policy and technical documents on its own, including the most recent white paper on IoT device security titled "Smart Policy to Secure Our Smart Future."

The evolution of traffic management systems from individual embedded controllers in roadside cabinets, to networked intelligent transportation systems necessitates further guidance and requirements on cybersecurity. This includes IoT device cybersecurity, network and system level cybersecurity and organization level cybersecurity systems—an evolving matrix of technical requirements and organizational policies. State and local transportation agencies, among the operators of traffic management systems, are currently the target of ransomware and other cybercrime.[4]

Cybersecurity significantly impacts safety when it comes to traffic control devices. For this reason, cybersecurity engineering needs to be viewed as an extension of safety engineering when deploying and operating the digital infrastructure that underpins modern road infrastructure. For example, the Ohio Turnpike is 241 miles of road and 241 miles of fiber optic cable, enabling system to monitor and manage traffic.[5]

USDOT should recognize that other federal government agencies and departments are already operating in the cybersecurity space, including those that produce standards and recommendations for device manufacturers, such as NIST. Duplication by federal agencies would hinder innovation and reduce uniformity.

Motorist, pedestrian, and worker privacy needs to be considered when developing rules for the use of technology in smart city applications. The privacy implications behind data collection and ownership important when setting standards for technology. States and localities might prevent the adoption of targeted technologies meant to increase safety if there are public concerns over the privacy of motorists, pedestrians, or workers. CTA supports thoughtful and smart federal privacy standards and policies.

IV. Proposed New Part 5 Regarding Automated Vehicles

[4] Cybersecurity of Traffic Management Systems, NCHRP 03-127, October 15, 2019, Transportation Research Board, https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4179

[5] https://drive.ohio.gov/wps/portal/gov/driveohio/know-our-projects/projects/11-ohio-turnpike

CTA supports objectives in the proposed Part 5 and the statements throughout recognizing that steps taken to support SDVs will also benefit human drivers.

a. Section 5B.01 Signs. Standardization of signs and illumination of electronic signs will benefit both human drivers and machine vision technology. In this section, it would be valuable to include guidance on maintaining deteriorated or vandalized signs.

b. Section 5A.02 Overview of Connected and Automated Vehicles. CTA suggests that FHWA includes examples of technologies that are already in on-road vehicles to demonstrate that many of the same technologies that will be used in AVs are used for current ADAS and advanced safety systems. Consistent and clearly visible lane markings benefit SDVs and human operators alike, while improving overall safety of all road users. CTA recommends the FHWA adopt SAE J3016 with respect to the definition of related driver assistance and/or automated driving systems (e.g., SAE level 0-5).

c. Section 5B.03. CTA suggests that the MUTCD clarifies that many SDV designs will not rely on or use vehicle-to vehicle (V@V) or vehicle-to-infrastructure (V2I) integration, and that V2V/V2I is one of many tools that could potentially enhance automation.

d. Section 5B.04 Temporary Traffic Control. Predictable and clear temporary traffic controls will enhance the safety of all road users – drivers, SDVs, VRUs, and road workers alike. Beneficial traffic controls include providing signage and temporary lane markings, as well as recommended guidance to completely obliterate pavement markings that are no longer applicable. The FHWA should develop a minimum standard for electric signs since refresh rates lower than 200 Hz may not be readable by driver assistance and/or automated driving systems using a camera.

e. Section 5B.06 Traffic Control for Bicycle Facilities. Lane striping for bike lanes varies from state to state. Encouraging consistency between states would improve safety and predictability for bicyclists, human-operated vehicles, SDVs, and all other road users.

f. Clarify that all the suggestions throughout the chapter would benefit AVs and human drivers alike, and such suggestions are helpful but not necessary for safe operation of SDVs.

g. Section 2I.15 Signing for Truck Parking Availability. CTA supports FHWA's statement regarding the use of Truck Parking Availability General Service signs that may be used to display the number of available truck parking spaces at roadside areas such as rest areas, welcome centers, and weigh stations, and at facilities off a highway that are open to the public and provide parking for commercial vehicles. More, standardized open data specifications for these parking spots can help truck drivers better plan their routes and park more efficiently.

The inclusion of a Part 5 Automated Vehicles in the MUTCD is an appropriate step to help improve functionality of commercial truck ADS. Upgraded infrastructure, such as advanced traffic control devices and road systems, has the potential to reduce technical challenges and therefore risk. To the extent that agencies make these improvements, the full benefits of automated trucking will be achieved sooner.

More, next generation truck parking can play a critical role in the deployment of self-driving trucks, by services as "truckports" where loads can be switched between autonomous and human-driven trucks.

V. Conclusion

CTA commends FHWA's and USDOT's leadership in promoting the safe and timely implementation of traffic control systems. Please let us know what additional assistance or information we can provide.

Sincerely,

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