

2017

Traffic Control Device Challenge



Sponsored by



Standing Committee on
Traffic Control Devices



SAFER ROADS SAVE LIVES

OVERVIEW

The objective of the Traffic Control Device Challenge (TCDC) is to promote innovation and stimulate ideas in the traffic control devices area with a goal to improve operations and safety. The challenge is sponsored by and conducted cooperatively by the Transportation Research Board Standing Committee on Traffic Control Devices (AHB50) and the American Traffic Safety Services Association (ATSSA).

GUIDELINES FOR PARTICIPATION

The TCDC is open to individual high school, junior college, college, or university students or teams of students with an interest in transportation and an understanding of traffic control devices. Students in relevant fields such as transportation-, human factors-, and graphic design-related curricula are particularly encouraged to participate.

The TCDC submittals will help to encourage innovation and creative thought in the transportation community. Contest participants will receive the opportunity to vet their designs in a public forum. Three winning teams will receive recognition at national transportation forums.

PROBLEM STATEMENT

The focus of this year's TCDC is *Traffic control device designs, ideas, enhancements, and/or standards to support advanced vehicle technologies, connected vehicles, or autonomous vehicles*. In order to focus the submissions, priorities will be given to submissions including pavement markings, traffic signing, and/or work zone devices.

Background

Autonomous vehicles are coming. There may be a day in the distant future when these advanced vehicles can navigate without relying on physical traffic control infrastructure. However, before that happens, there are likely to be decades when physical guidance has to serve both the human and “the machine” drivers. This physical traffic control device infrastructure consists of the traffic signals, signs, and pavement markings that assist human drivers safely navigate the system and control their individual vehicles every day. Traffic control devices have a long history of research, development, and testing to ensure that human road users can navigate anywhere within the United States without having to relearn traffic laws, ordinances, and rules of the road. The design and use of these devices is governed by the Manual on Uniform Traffic Control Devices (MUTCD [<http://mutcd.fhwa.dot.gov/>]), which is published and maintained by the Federal Highway Administration of the U.S. Department of Transportation. The MUTCD has evolved over the last 80 years to define a system that provides public agencies guidance on the uniform application of traffic control devices. Up until now, all of the research, testing, and application guidance provided through the MUTCD has focused exclusively on the human

driver. There is a growing and urgent need to assess how traffic control devices can be modified, enhanced, and/or changed to accommodate both the human driver and the “machine” driver. While human drivers use their vision and other senses to navigate, guide, and control their vehicles, “machine” drivers use a combination of laser, radar, and ultrasonic sensors, cameras, GPS mapping, and computer intelligence to navigate, guide, and control a vehicle (<https://www.google.com/selfdrivingcar/how/>; <https://www.teslamotors.com/blog/your-autopilot-has-arrived>). While the “machine” driving element of different types of vehicles is a giant leap forward, the “machines” rely on the physical traffic control infrastructure to perform the driving task. As mentioned above, there has been over 80 years of research, development, testing, and deployment experience to put in place the system we have today, but this system was optimized for human drivers. How the current system needs to change to accommodate both the human and machine drivers is the basic idea of this competition. What are the traffic control device designs, ideas, enhancements, and/or standards that will support the continuing development of advanced vehicle, connected vehicle, or autonomous vehicle technologies? That is the challenge for you and your teammates.

GUIDELINES FOR PARTICIPATION

Contest Eligibility

Submitter Eligibility

The TCDC is open to individual high school, junior college, college, or university students or teams of students. All that is required of submitters is a keen interest in transportation and an understanding of traffic control devices.

If selected as a finalist, submitters need to plan on being at the TRB Annual Meeting, which will be held January 8 through 12, 2017 in Washington, DC (or have a representative there). The judging for the top three submissions will take place during the TRB Annual Meeting. The first, second and third place winners will be expected to attend the ATSSA Convention and Traffic Expo, February 12 – 14, in Phoenix, AZ. ATSSA will provide financial support for travel to this event.

Originality of Design

The submissions must be an original design of the designer(s) or modifications to an existing industry-accepted design or product. In the case of a modification to an existing TCD, the original TCD that is being modified should be acknowledged.

Individuals or Teams

Individual or teams can participate. Each individual or team submittal should have a lead contact specified by name and affiliation.

Multiple Submittals

Multiple submissions are allowed by individuals or by teams. Each submission will be considered independently and, as such, should be submitted in a separate submission package.



Competition Scheduling

The following table presents key dates for submitting and participating in the TCDC.

Milestone	Date
Announcement of TCDC	May 1, 2016
Submission Deadline	October 1, 2016
Review of Submissions for Eligibility	October 15, 2016
Notification of 12 Teams Invited to Display Their Work	November 1, 2016
Display of Eligible Submissions and Judging	Sometime during the TRB Annual Meeting, January 8 to 12, 2017
Announcement and Recognition of Winners	January (at TRB) and February 12 to 14, 2017 (at ATSSA)

Submittal Specifications

The submission packet can include drawings, photographs, or other graphical renderings that can be encapsulated in a PDF file. Submittals are limited to five pages in length, including all text and graphics, packaged in a PDF format. Submitters are encouraged to provide a narrative in the five pages that explains the traffic control device or system of devices and describe how the submittal addresses each of the review criteria as specified below. The submitter should strive to communicate in a succinct manner.

Each TCDC submittal must also include a signed submission form (not included in the submittal page total), included as Attachment 1 to this guide.

REVIEW AND AWARD PROCESS

Evaluation Criteria

Submissions will be evaluated based on four evaluation criteria, each equally weighted by the judges.

- Ability of the idea to address the problem.** The judges will review the submission and assess how well it mitigates the problem identified in the problem statement.



- **Ease of understanding.** The judges will assess if the submission would be easily understood by the traveling public, including motorists, pedestrians, and bicyclists.
- **Applicability.** The judges will assess the submission's applicability and transferability to various environments and roadways. For example, ideas that will only work on two-lane roads or in warm climates will not be scored as highly as designs that will work on any roadway class in diverse climates.
- **Feasibility for Implementation.** The judges will assess the feasibility of the idea. They will consider the likelihood that the idea could be accepted by the transportation community and implemented on the nation's roadway. The potential cost of implementation, the ease of implementation, and the availability of materials can be part of the judges' considerations.

Review Process

The TCDC committee will screen each submittal to verify that it adheres to the contest guidelines. The committee will use the evaluation criteria to select up to 12 finalists to be displayed at a poster session during the 2017 Transportation Research Board Annual Meeting.

Those selected to display their submittal at TRB will receive an email by November 1, 2016 informing them of their selection.

Judging of Finalists

Finalists are expected to display a poster (prepared according to the guidelines used for TRB poster sessions; see: <http://onlinepubs.trb.org/onlinepubs/am/2015/PosterGuidelines.pdf>) that communicates their idea and addresses how it meets the evaluation criteria. The panel of judges will evaluate the posters at the TRB annual meeting on the day of the contest. The judges will represent the practicing transportation community. The first, second and third place winners will be selected by that panel of experts.

Awards

First, second, and third place will receive awards as specified in the following table.

PLACE	AWARD
FIRST	Opportunity to present the concept in a “Traffic Talk” at the ATSSA Convention in Phoenix, AZ. Travel expenses for 1 speaker. \$1,500 cash prize. First place plaque.*
SECOND	Opportunity to present the concept in a “Traffic Talk” at the ATSSA Convention in Phoenix, AZ. Travel expenses for 1 speaker. \$1,000 cash prize. Second place plaque.*
THIRD	Opportunity to present the concept in a “Traffic Talk” at the ATSSA Convention in Phoenix, AZ. Travel expenses for 1 speaker. \$500 cash prize. Third place plaque.*
Honorable mentions	Certificate of Recognition for up to 10 honorable mention entries.

*In addition to the opportunity to present the idea in a “Traffic Talk,” the three place winners will be provided a (joint) exhibit booth to display their posters. The placing prize winners will be announced at the ATSSA meeting’s opening general session. ATSSA will also include an article in their industry magazine, *The Signal*, the placing winners and, with their agreement, a home town press release.

CONTACT FOR ADDITIONAL INFORMATION

For questions about the TCDC not addressed by this participation guide, please email paul-carlson@tamu.edu.



ATTACHMENT 1: Design Submission Form

**2017 Traffic Control Device Challenge
Submission Form**

Instructions: The following form must be completed and signed by the team leader on behalf of all named members of the team and submitted with your package. Please scan the signed form as a PDF and include as part of you submission package. Include contact information for each member. Attach additional pages as necessary.

TCDC Title: _____

Team Leader: _____

Affiliation: _____

Email: _____ Telephone: _____

Teammate: _____

Affiliation: _____

Email: _____ Telephone: _____

Teammate: _____

Affiliation: _____

Email: _____ Telephone: _____

Teammate: _____

Affiliation: _____

Email: _____ Telephone: _____

Lead Submitter's Signature

By signing this form, I acknowledge that the above listed participants have all agreed to the TCDC's submittal and if selected as a finalist, agree to display a poster at the Transportation Research Board Annual Meeting in Washington, D.C.

Lead Submitter

Date

Send submission forms for the 2017 Traffic Control Device Challenge to:

Paul Carlson, Chair AHB50
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College Station, TX 77843-3135

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