

OFFICE OF RESEARCH, DEVELOPMENT, AND TECHNOLOGY

VOICES PUBLIC ENGAGEMENT WEBINAR 1

VOICES Overview

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AGENDA



- Introduction to VOICES.
- VOICES technical overview.
- VOICES schedule.
- Question and answer.

VOICES = Virtual Open Innovation Collaborative Environment for Safety.





MEETING OBJECTIVES

- Describe background and motivation for VOICES.
- Provide high-level technical overview of VOICES platform.
- Lay out VOICES schedule and future webinar topics.
- Receive feedback and questions from attendees.





INTRODUCTION TO VOICES







An integrated, ubiquitously connected, and intelligent system of systems.



Source: USDOT.



THE CHALLENGE OF COLLABORATION

- Lack of a simple, effective, and efficient mechanism to perform collaborative research and testing.
- Multiplicity of stakeholders.
- Natural silos.
- Trust deficit.
- Intellectual property and competitive pressures.
- Cost and resource barriers.
- Lack of interoperable test tools and environment.



Source: USDOT.

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WHAT VOICES IS

- Distributed virtual platform that enables stakeholder virtual collaboration for research and interoperability testing of cooperative driving automation (CDA) applications.
- Intellectual property-protected environment.
- Collaboration tool for participating entities.
 - Public sector.
 - Private sector.
 - Academic institutions.



ITS = intelligent transportation systems, OEM = original equipment manufacturer

*VOICES. 2021. "Voices Overview" (webpage). <u>https://usdot-voices.atlassian.net/wiki/spaces/VP/overview</u>, last accessed October 6, 2021.



HOW VOICES WORKS



Source: USDOT.





VALUE AND IMPACT

The United States Department of Transportation (USDOT) leadership is advancing progress toward its vision of an integrated, seamless, efficient, clean, and equitable transportation system of the future.

VOICES is:

- A pathway to prepare for the transportation system of the future.
- An opportunity to advance equity, innovation, climate, and safety priorities.
- A way to harness convening power of government to enable collaboration.
- A platform to test for today and explore for tomorrow.



Source: USDOT.



VOICES TECHNICAL OVERVIEW







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HIGH-LEVEL ARCHITECTURE



Figure created using Microsoft Visio. CARMASM is a registered trademark of the Federal Highway Administration. SUMO is an open-source traffic simulation package developed by German Aerospace Center (DLR) and licensed under EPL 2.0. SUMO logo used with permission from DLR. CARLA[®] logo used with permissions from the Computer Vision Center (CVC). CARLA is an open-source simulator developed by CVC and trademarked by the CARLA Team 2021.

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SCENARIO DATABASE OVERVIEW



- Develop a set of functional and definitive scenarios for each use case.
 - Define parameters necessary for actors of a given scenario.
 - Describe file formats and structures for scenario descriptions and scenario files.
- Allow ingest of a concrete scenario using application programming interfaces to CARLA[®] or SUMO.
- Define labels for test parameters and applicable values.
- Allow scenario filtering to quickly identify scenarios.
- Match scenarios to a real-world operating environment.
- Develop pass criteria for each scenario.



VOICES IMPLEMENTATION

Process for users looking to run a cooperative distributed test in VOICES:

- User logs into VOICES portal. 1.
- User browses VOICES scenario database. 2
- 3 User chooses test scenario and coordinates with other stakeholders.
- Scenario manager launches container.* 4.
- 5. Scenario manager sends:
 - a) Maneuver plan to system under test.
 - b) Vehicle configuration to adapter.
 - Traffic signal configuration to adapter. c)
 - Simulator configuration to adapter.
- Scenario is executed once all members 6 select to join the test.
- Results are collected and distributed. 7

*A container is a standard unit of software that packages code and its dependencies.





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SAMPLE USE CASE: PLATOONING



*CACC: Cooperative Adaptive Cruise Control.

**Note example A has been defined using CDA vehicles (i.e., SAE Levels 1 to 5 automation), and the B and C examples have been defined for C-ADS (i.e., SAE Levels 3 to 5 automation).

NOTE: In practice, one-way transmission will typically send the message to multiple CDA devices in the vicinity.

SAE International. 2020. Taxonomy and Definitions for Terms Related to Cooperative Driving Automation for On-Road Motor Vehicles. J3216 202005, United States. https://www.sae.org/standards/content/j3216 202005/, last accessed August 31, 2021.

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system.



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VOICES SCHEDULE





SCHEDULE AND MILESTONES





Source: USDOT.





UPCOMING WEBINARS

- VOICES updates and material will be presented at webinars, and attendees are encouraged to provide written feedback or questions after each webinar.
- Webinars on the following topics are planned for every 3–4 mo:
 - VOICES overview.
 - Use case development.
 - TENA-CARMASM integration.
 - Technology transfer.
 - Use case testing and reporting.







QUESTION AND ANSWER

Please submit questions via the chat pod.





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