Connected Intersections Committee Scope

(update 06/15/20 based on comments from CI Committee.
Note: CI Committee Scope was approved)

1 Background

The United States Department of Transportation (USDOT)ITS Joint Program Office (JPO) is sponsoring the development and publication of a Connected Intersection (CI) implementation guide that defines the key capabilities and interfaces a connected signalized intersection must support to ensure interoperability with production vehicles for state and local infrastructure owner/operators (IOO). A connected signalized intersection is defined as an infrastructure system that broadcasts signal, phase and timing (SPaT), mapping information and position correction data to vehicles. For the purposes of this task, the CI implementation guide will undergo systems engineering process, reference existing standards, and gain standards development organizations (SDO) consensus.

This effort involves engaging with Stakeholders representing the industry at large including but not limited to IOOs, Automotive Original Equipment Manufacturers (OEMs), Fleet and Truck operators, safety advocacy groups, multimodal partners and end users of data and services. Several associations - SAE International (SAE), American Association of State Highway Transportation Officials (AASHTO), National Electrical Manufacturers Associations (NEMA), IEEE and Institute of Transportation Engineers (ITE) - are involved in ensuring balanced and effective stakeholder representation and adherence to Standards Development Process as Standards Development Organizations (SDO). Several modal agencies within USDOT are likely to be engaged so that safety, fleet, trucking and pedestrian interests are safeguarded as well as in providing resources as needed to help implementation within two years.

2 Connected Intersections (CI) Committee Scope

The scope of the Connected Intersections (CI) Committee is to develop and publish document(s) that defines the minimum requirements a connected intersection must support to ensure national interoperability among road users, equipped devices/vehicles and connected intersections. A connected intersection is defined as an infrastructure system that broadcasts SPaT data, mapping information, and position correction data to vehicles.

Following the Systems Engineering Process (SEP), project development will include a Concept of Operations (ConOps), System Requirements (SyRS or Functional Requirements), System Design Details, and associated walkthroughs, as well as an optional application software reference implementation.

Products produced by the CI Committee should provide enough guidance to broadcast messages and develop applications that are truly interoperable; address ambiguities and gaps identified by early deployers; and describe a phased approach to ensure that future deployments will be interoperable across the United States. This is especially important for the development of connected and automated transportation systems, as they are expected to be important users of this technology.

3 Project Scope

The project purpose is to develop and publish a CI implementation guide that standardizes the key capabilities and interfaces for a connected intersection. For this project, a connected intersection is defined as an infrastructure system that broadcasts SPaT data, mapping information, and position correction data to vehicles. As part of addressing overall requirements, the CI implementation guide should address the ambiguities and gaps identified by early deployers and provide enough guidance to generate messages and develop applications for signalized intersections that are truly interoperable across the United States, especially for automated transportation systems. The first version of this CI implementation guide focuses on harmonizing the implementations of existing SPaT, MAP and RTCM messages, using the USDOT-sponsored *Cooperative Automated Transportation Clarifications for Consistent Implementations (CCIs) To Ensure National Interoperability Connected Signalized Intersections* as a starting point. The project will also develop a Software Reference Implementations (RI) of the developed CI implementation guide.

The project will follow a SEP, so project development will include a Concept of Operations (ConOps), System Requirements (SyRS or Functional Requirements), System Design Details, and associated SEP walkthroughs, and a software Reference Implementation.

3.1. Bounding Conditions:

1. The project purpose is to develop and publish a CI implementation guide that standardizes the key capabilities and interfaces for a connected intersection. The following bounding conditions will help keep the project on track and assist the CI Committee and the project team track the progress against the end of project date (herein called end of period of performance, POP) to ensure the products are complete and published prior to the end of POP.

2. Period of performance ending in September 18, 2021, is the first bounding condition to conclude this phase of the project requiring publication of a CI implementation guide using systems engineering by a consensus process.

3. Harmonizing the existing SPaT message, using the USDOT-sponsored *Cooperative Automated Transportation Clarifications for Consistent Implementations (CCIs) To Ensure National Interoperability Connected Signalized Intersections* as a starting point is another bounding condition. Exceeding this minimum bounding condition is to be considered only when the project risks have been reasonably addressed and mitigation is in place.

4. Early in the project, the CI Committee shall identify and prioritize SPaT-based applications that IOOs, OEMs, and road users can begin to deploy and validate in production vehicles and connected infrastructure. The CI Committee shall consider progress made in IOO-OEM initiatives such as the Cooperative Automated Transportation Coalition (CAT) Red-Light Violation Warning (RLVW) application in the vehicle.

5. The CI Implementation Guide shall be limited to the interface between the connected intersections and equipped devices/vehicles.

6. This version of the CI implementation guide developed shall assume local direct communications and shall be agnostic of communication technologies where feasible while clearly explaining any constraints in implementing systems to communicate using the WAVE Short Message (WSM) protocol.

7. The CI implementation guide shall identify and clarify ambiguities and gaps in the standards as agreed to by the CI Committee by consensus. Any gaps or ambiguities needing further research due to project schedule shall be clearly identified.

8. The CI Committee shall consider developing an agreement on needs that cannot be addressed within the current period of performance as parking-lot items that could be addressed in future phases of this project. However, future work or support is not obligated beyond the current period.

9. The CI implementation guide shall clearly identify dependencies to external standards and projects outside of the CI Committee's scope. The method of attribution to external standards is by reference. If the CI implementation guide identifies gaps or ambiguities in an external standard, a CI Committee member or a liaison may inform the committee that owns the external standard of the identified gap or ambiguity.

10. The CI Committee, with assistance from its members, shall reach out to stakeholders extensively using support from IEEE, SAE, NEMA, AASHTO and ITE. However, any input received would need to timely and in sync with the project schedule and SEP to be effectively subsumed into the CI implementation guide and offered up to the CI Committee. Any validated input received or feedback received later in the project development shall be retained and published in the comments matrix and marked for potential future update.

11. The CI Committee may reach out to its members to validate and verify the products developed as part of the CI implementation guide at no cost to the Committee. Verification and validation of CI products may include the development of test tools and test procedures, but requires that the members inform the CI Committee of any ambiguities or gaps discovered in the CI implementation guide.

4 Connected Intersections Site

1. A public website has been established to report on progress, provide public access to deliverables, to provide comments and to contact the CI Committee. The website is located at: https://www.ite.org/technical-resources/standards/connected-intersections/
2. The latest version of the CCI document will be found here: https://transportationops.org/CATCoalition/IOO_OEM_Forum