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# **Connected Intersections Walkthrough ConOps Walkthrough**

August 31 – September 2  
(11:30 AM – 5:30 PM EDT)

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## **Agenda (Goudy, Thai)**

1. Call to Order
2. Anti-Trust Guidelines & Logistics
3. Roll Call/Welcome Remarks
4. Project Status
5. Logistics/Meeting Guidance
6. Walkthrough Process
7. Walkthrough of Draft ConOps document
8. Next Step
9. Adjourn

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## Anti-Trust Guidance (Narla)

- The Institute of Transportation Engineers is committed to compliance with antitrust laws and all meetings will be conducted in strict compliance with these antitrust guidelines. Further if an item comes up for which you have conflict of interest, please declare that you have a conflict of interest on the matter and recuse yourself from action on that item.
- The following discussions and/or exchanges of information by or among competitors concerning are prohibited:
  - Prices, price changes, price quotations, pricing policies, discounts, payment terms, credit, allowances or terms or conditions of sale;
  - Profits, profit margins or cost data;
  - Market shares, sales territories or markets;
  - The allocation of customer territories;
  - Selection, rejection or termination of customers or suppliers;
  - Restricting the territory or markets in which a company may sell services or products;
  - Restricting the customers to whom a company may sell;
  - Unreasonable restrictions on the development or use of technologies; or
  - Any matter which is inconsistent with the proposition that each company must exercise its independent business judgement in pricing its service or products, dealing with its customers and suppliers and choosing the markets in which it will compete.

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## Roll Call of Committee Members

- John Thai, City of Anaheim
- Raj Ponnaluri, Florida DOT
- Christina Spindler, Wyoming DOT
- Ray Starr, Minnesota DOT
- Ed Seymour, Texas A&M Transportation
- Faisal Saleem, AZ McDOT Maricopa County
- Whitney Nottage, Q-Free/Intelight
- Steve Bowles, 360 Network Solutions
- Roy Goudy, Nissan
- Mike Schagrín, McCain
- Mike Shulman, Ford Motors
- Vivek Vijayakumar, General Motors
- Michael Stelts, Panasonic
- Jim Misener, Qualcomm
- Doug Schmidt, Aptiv
- Jay Parikh, CAMP/IOO-OEM Forum
- Jason Graves, Denso International
- Justin McNew, JMC Rota

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## Welcoming Remarks

- USDOT (Thompson, Curtis)

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## Project Status

- First CI Committee meeting – 4/8
  - <https://www.ite.org/technical-resources/standards/connected-intersections/>
- Task Forces Formed
  - 5 Task Forces created – meeting weekly
- Each Task Force submitted draft User Needs – 8/14
- Draft ConOps document distributed – 8/18
- ConOps Walkthrough – 8/31-9/2

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# Logistics

- Purpose:
  - Solicit input from attendees on the ConOps, Systems Engineering Process (SEP) and implementation perspectives.
- Objectives
  - Find anomalies
  - Improve the ConOps
  - Consider alternatives
  - Ensure conformance to standards and specifications
  - Ensure completeness
  - Gain a consensus on the user needs and the other material within ConOps.

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## Meeting Guidance / Robert's Rules

- Using Robert's Rules of Orders to conduct meeting
  - Quorum is needed
  - Parliamentary procedures
  - Call the Question (State the outcome, record the outcome, follow up as necessary, move on)
  - Let all members speak once before allowing anyone to speak a second time
  - Use consensus (majority rules)



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## Roles of the Walkthrough Process

- Walkthrough Leader (Chan): Lead walkthrough/guide discussion
- Recorder (Chan/Lahiri): Record all revisions with basis of revisions (anomalies)
- Author (Task Force): Subject Matter Expert on standard details with overview of Standard
- Review Team (All others): Identify anomalies, discuss, propose and agree to appropriate resolutions

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## User Need Criteria

- **Uniquely Identifiable.** Each need must be uniquely identified that is each need shall be assigned a unique number and title.
- **Major Desired Capability (MDC).** Each need shall express a major desired capability (corridor level) in the system, regardless of whether the capability exists in the current system or situation or is a gap.
- **Solution Free.** Each need shall be solution free, thus giving designers flexibility and latitude to produce the best feasible solution.
- **Capture Rationale.** Each need shall capture the rationale or intent as to why the capability is needed in the system.

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## Walkthrough Inputs

- Draft ConOps Document
- Inputs (proposed revisions) on draft ConOps document
- ConOps Walkthrough Workbook

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# Review of the Walkthrough Process

1. Review any comments received prior to the walkthrough
  - Identify resolutions or defer the comments to the appropriate place in the walkthrough workbook
2. Perform a detailed review of draft ConOps document using the ConOps Walkthrough Workbook
  - Read sections of the ConOps identified in the walkthrough workbook capturing comments in real-time in the walkthrough workbook and, if appropriate, in the draft ConOps to reflect inputs from walkthrough participants.
  - Review each user need to ensure that it meets the criteria identified in the walkthrough workbook and, if revisions are necessary, that they are captured in the walkthrough workbook.
  - Collect and document new user needs proposed by participants as agreed upon by the CI Committee.

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## Walkthrough Outputs

- A marked-up walkthrough workbook, indicating which user needs were reviewed, the result of the evaluation of that user need, and input provided during the walkthrough that results in a revision.
- After the walkthrough, ITE will deliver an walkthrough report which identifies inputs received during the walkthrough, using track changes in a copy of the walkthrough workbook.
- Following the walkthrough, ITE will deliver an updated ConOps document reflecting revisions resulting from walkthrough.

# ConOps Walkthrough

## 1.1 Scope

This document is 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 intersection is defined as an infrastructure system that broadcasts signal, phase, and timing (SPaT), mapping information (MAP), and position correction data to vehicles.

This CI Implementation Guide addresses the ambiguities and gaps identified by early deployers and provides guidance to generate messages and develop applications for signalized intersections that are interoperable across the United States, especially for automated transportation systems. This document focuses on harmonizing the existing SPaT messages deployed, using the United States Department of Transportation (USDOT) sponsored Cooperative Automated Transportation Clarifications for Consistent Implementations (CCIs) To Ensure National Interoperability Connected Signalized Intersections as a starting point.

This document was developed with the combined effort of 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), Institute of Electrical and Electronics Engineers (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 were also 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.

The Implementation Guide follows a Systems Engineering Process (SEP), so the contents of this document include Concept of Operations (ConOps), a System Requirements (Functional Requirements), and System Design Details sections.

Based on the capabilities and interfaces to be standardized, the document defines the minimum requirements for a connected intersection. It is intended to be used by IOOs to provide guidance on how to implement an interoperable connected intersection. For OEMs, this document provides an explanation on what data is being provided from an interoperable connected intersection so applications can be developed for production vehicles.

<b>Final Resolution</b>	<b>Approved</b> <input type="checkbox"/>	<b>Modify</b> <input type="checkbox"/>
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# ConOps Walkthrough

UN ID	Description	MDC	Rationale	Comments
<b>2.4.1 Architectural Needs</b>	A connected intersection needs to use a communications technology to exchange data with the applications on an OBU/MU in a timely manner. This feature allows an application on an OBU/MU to receive data, such as signal timing information, with enough low latency so the application can properly process the data from the CI and react to the dynamic situation at the intersection. The reaction may include providing warnings or alerts to the driver or VRU, or taking an appropriate action.			
<b>2.4.2 Messages</b>	This section identifies needs related to a connected intersection providing information from the infrastructure.			
<b>2.4.2.1 Message Performance Needs</b>	This section identifies performance needs for a connected intersection providing information from the infrastructure.			
<b>2.4.2.1.1 Uniform</b>	<p>The connected intersection needs to provide data uniformly, that is, each data field is standardized in its format and interpreted consistently. Each data value should be produced using defined states, functions, or processes regardless of the manufacturer or software provider. Uniform data fields increase interoperability between the infrastructure components and the applications that use the data to aid drivers and VRUs.</p> <p>For example, connected intersections should provide a uniform representation of roadway features. Inconsistencies in how roadway features are represented lead to inconsistent usage and interpretations by applications that use roadway features. A uniform representation of roadway features increases the effectiveness of the applications that aid drivers and vulnerable road users.</p>			

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## Next Steps

- Update Draft ConOps document
  - Distribute by September 11 for a 2-week comment period.
- Final Concept of Operations
  - Schedule for September 29, but expected October 5
- Start Requirements phase



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# Adjourn

– Thank you!