

Connected Intersections ConOps Walkthrough

The following are meeting minutes from meeting of the Connected Intersections (CI) Committee Concept of Operations (ConOps) walkthrough, scheduled for Monday August 31, 2020 – Wednesday September 2, 2020 from 11:30 AM EDT to 5:30 PM EDT each day by web conference on GoToTraining.

The agenda and chatlog is provided at the end of these minutes.

All times in EDT.

Roll Call of Committee

The committee members in attendance were:

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|--|--|---------------------------------------|
| Roy Goudy, Nissan (co-chair) | Ed Seymour, TTI | Mike Stelts, Panasonic |
| John Thai, City of Anaheim (co-chair) (Day 1, Day 2) | Faisal Saleem, Maricopa County (Day 1) | Ray Starr, Minnesota DOT |
| Christina Spindler, Wyoming DOT | Jay Parikh, CAMP | Raj Ponnaluri, Florida DOT (Day 1) |
| Doug Schimdt, Aptiv (Day 1) | Jim Misener, Qualcomm | Shah Hussein, CAMP (for Mike Shulman) |
| Doug Tarico, Q-Free/ Intelight (for Whitney Nottage) | Justin McNew, JMC Rota | Vivek Vijayakumar, GM (Day 1, Day 2) |
| | Mike Schagrin, McCain (Day 1) | |

Also in attendance were:

| | | |
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| Aaron Moore, OmniAir (Day 1) | Doug Gettman, Kimley Horn (Day 2) | Kevin Chan, Minnesota DOT (Day 1) |
| AJ Lahiri, ConSysTec | Drew Van Duren, Qualcomm | Kevin Vitta, ITS America |
| Alan Clelland, Applied Information | Ed Leslie, Leidos | Kingsley Azubike, USDOT (Day 2) |
| Alan Davis, GDOT | Eric Raamot, Econolite (Day 1) | Krishna Bandi, Ford (Day 1, Day 2) |
| Anthony Gasiorowski | Glenn Havinoviski, WGI (Day 1, Day 2) | Kyle Garret, Synesis Partners (Day 2) |
| April Wire, MCDOT (Day 1) | Haydar Issa, Transport Canada (Day 1, Day 3) | Linda Nana, Noblis |
| Barbara Wendling, QS-2 | Iouri Nemirovski, Siemens (Day 2) | Manny Insignares, ConSysTec |
| Barry Einsig, Econolite | James Alfred, Blackberry | Masoud Motamedi, JMC Rota |
| Blaine Leonard, UDOT (Day 1, Day 2) | Jasja Tijink, Kapsch | Mateusz Malinowski, Panasonic |
| Bill Lattin (Day 1, Day 2) | Jean Johnson, NEMA | Matt D'Angelo, Gresham Smith |
| Bob Rausch, TransCore | Jesus Ruiz, McCain (Day 1, Day 2) | Michael Clifford, Toyota (Day 1, Day 2) |
| Bruce Eisenhart, ConSysTec (Day 1, Day 2) | Jimmy Upton, ISS | Michael Maile |
| Christopher Poe, Mixon Hill (Day 1, Day 2) | Jingtao Ma, Traffic Technology Services | Michael Stelts, Panasonic |
| Chuck Felice, UDOT | Joanna Wadsworth, City of Las Vegas (Day 1) | Michaela Vanderveen, Still Water |
| Dale Thompson, USDOT (Day 1) | John Kenney, TNA | Mitra Mirahassani |
| Danyang Tian, Honda | Justin Anderson, Noblis | Mohammad Hadi, FIU |
| David Benevelli, TransCore | Kellen Shain, Noblis | Nicola Tavares, ITE |
| Dean Deeter, Athey Creek (Day 1, Day 2) | Ken Yang, AECOM (Day 1, Day 3) | Patrick Chan, ConSysTec |
| Deborah Curtis, USDOT | Kevin Balke, TTI | Peter Glowacki, CSA (Day 1, Day 2) |
| | | Peter Jager, UDOT |

| | | |
|---|---|--|
| Polly Okunieff, GO Systems (Day 1, Day 2) | Robert Saylor, City of Plano (Day 2, Day 3) | Thomas Kurihara, TKStds |
| Purser Sturgeon, SwRI (Day 2, Day 3) | Siva Narla, ITE | Venkat Nallamothe, AASHTO (Day 1) |
| Ralph Boaz, Pillar Consulting | Srinivasa Sunkari TTI | William Whyte, Qualcomm |
| Randy Roebuck, OmniAir | Steve Sill, USDOT (Day 1) | Wolfgang Buckel, Siemens |
| Rich Deering, CAMP | Sue Bai, Honda (Day 2) | Yang Tao, City of Madison (Day 2, Day 3) |
| | Ted Sadler, Integral Blue (Day 1, Day 2) | Zhitong Huang, Leidos |

Day 1

Roy Goudy called the meeting to order at 11:30.

Siva Narla reviewed ITE's anti-trust guidelines.

Roll Call of Committee took place. A quorum was present.

Welcome Remarks

Deb Curtis and Steve Sill gave welcoming remarks.

Project Status

Roy Goudy reviewed the Project Status.

Logistics/Meeting Guidance

Roy Goudy reviewed the meeting logistics and noted that Robert's Rules are in effect.

Walkthrough Process

Roy Goudy discussed the roles of the walkthrough process.

Patrick Chan went over the user need criteria.

Patrick Chan discussed the walkthrough inputs (what everyone is beginning walkthrough with).

Patrick Chan went over the walkthrough process.

Patrick Chan discussed the walkthrough outputs (what is expected to be completed by end of walkthrough).

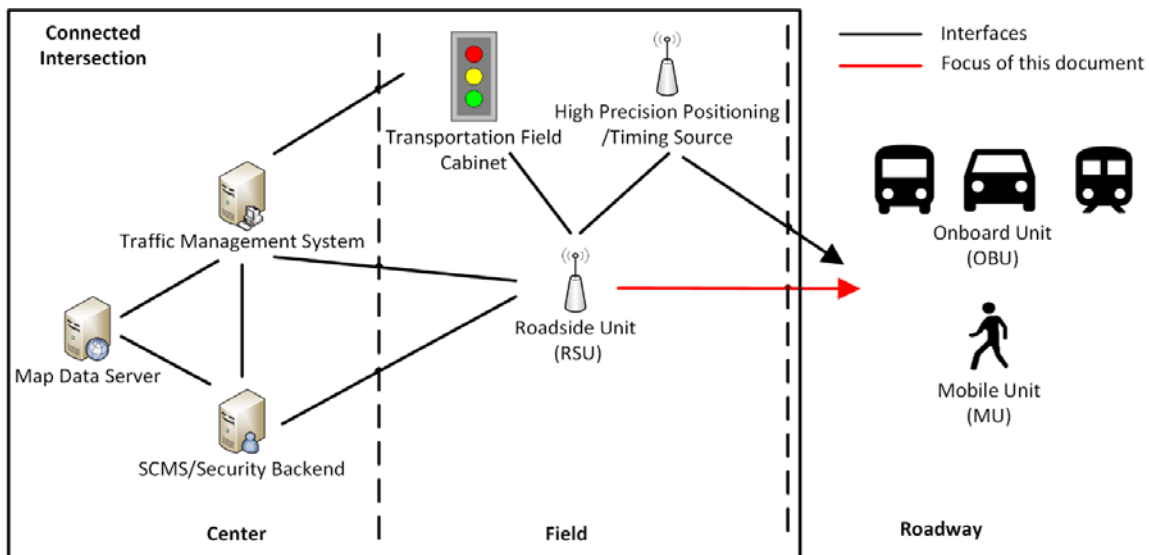
Walkthrough of Draft ConOps Document

Walkthrough workbook was distributed on August 21.

Patrick Chan presented updated walkthrough workbook that incorporated any comments received by end of day on Friday, August 28.

- 1.1 Scope
 - Jean Johnson recommended using term CI "implementation guide" instead of "document"

- Recommend using term “implementation guidance” instead of minimum requirements
- Raj Ponnulari recommended using terms “expectations” to emphasize that users should aim for them, even though it is not a standard.
- Group is divided on if scope should focus on Red Light Violation Warnings or if initial scope is on using SPAT/MAP messages and interoperability for general applications
- **Action:** Group to determine if scope should be broader than Red Light Violation Warnings.
- 3.2 Reference Physical Architecture
 - Discussed splitting into two: One for SPaT/MAP and one for positioning
 - Removed arrow between positioning source to OBU/MU - not part of the CI scope.
 - Black solid line - it is used for the CI scope - use a different line.
 - Wolfgang Buckel: Change to high precision position icon.
 - Change to Vehicle/personal instead of Roadway to be consistent with ARC-IT.
 - V2X Triangulation is out of scope. Uses multiple RSUs to improve accuracy for OBUs/MUs.
 - Add arrows in both directions (except from MAP data to TMS, and positioning source, and RSU -> OBU/MU)



- **2.4 Needs**
- 2.4.2.1.2 Quality Assurance - replaced quality assurance with message accuracy. Quality assurance refers to a management plan
- 2.4.2.1.3 Robustness. Discussed whether to use robustness or resilience
 - Robustness - degree to which a system or component can function correctly in the presence of invalid inputs or stressful environmental conditions (ISO/IEC/IEEE 24765:2017 Systems and software engineering-Vocabulary)
 - Resilience is the ability of a system to respond to perturbations and restore an acceptable level of functionality, within an acceptable time limit. For example, if the time of change for a traffic controller is not a reliable, the RSU may still broadcast intersection status data but not time-of-change data for a SPaT message.
 - **Action:** Bob Rausch to review.

- Agreed on term “Robustness” for this need
- Added need for SPaT Message and Roadway Indications Synchronization
 - SPaT Message and Roadway Indications Synchronization. The connected intersection needs to provide SPaT information that is synchronized with signal indication changes on the roadway within a defined tolerance. For safety and effectiveness, applications require consistency between the perceived state of the intersection by road users and the state received via a SPaT message by the applications. Synchronization enables applications to safely and effectively provide services to road users.
- 2.4.2.2.2 Real time Kinematic is a positioning need
 - GNSS includes timing and position.
 - This need may be a requirement
- 2.4.2.3.2 Intersection Status
 - **Action:** Traffic Signal Controller TF to review
- 2.4.2.3.3 Next Movement State
 - May be worth deleting. Keeping for now.
 - **Action:** Traffic Signal Controller TF to review

Adjourn 5:00 PM

Day 2

Reconvened and call to order at 11:30 AM

Discussed issues with co-chairs not seeing raised hands.

Action: Nicola Tavares to designate co-chairs as organizers. Patrick Chan to only be presenter.

Siva Nara reviewed ITE Anti-Trust Guidance

Roll Call of Committee. A quorum was present.

Reviewed Day One of walkthrough.

Resumed walking through needs

- 2.4.2.3.5 Time Change Details
 - Polly Okunieff asked about Transit Signal Priority inclusion. Patrick Chan mentioned not included due to limited time
 - Deborah Curtis mentioned that Automated Driving Systems is out of scope. Parking Lot for now.
- 2.4.2.3.6 Confidence factor for next interval
 - **Action:** Confidence factor subcommittee to review
- 2.4.2.3.7 Next Green
 - Ralph Boaz said next green is prediction and may change. A confidence factor for next green is a critical need.
 - Robert Saylor mentioned that confidence varies (e.g. it can change because of a preemption call)
- 2.4.2.3.8

- SPAT and MAP cannot be viewed as independent, but then BOTH need to reflect the actual usage. The timing plan and the operating geometry HAVE to be agreement. If an entity changes the timing plan, the geometry environment reflect in the signal time ALSO needs to be changed.
- Added need for revocable lanes
 - A connected intersection needs to identify lanes that are revocable
- 2.4.2.5.2 Positioning Timing
 - Removed user need
 - 2.4.2.2.1 Time Source updated to include precision
 - 2.4.2.5.1 Amended to include position and timing accuracy
- 2.4.3.1.6 Resilience
 - **Action:** Security TF to review
 - **Action:** All TF should look at degraded modes of operation during the requirement phase.
- 2.4.3.3.1 Misbehavior Reporting by OBUs
 - May be out of scope. Move to parking lot.
 - An OBU can report that it sees a conflict between the message and what it sees, but that's not addressed by any group/standard right now.
- 2.4.3.3.2 Misbehavior Reporting by IOO Field Devices
 - **Action:** SCMS Manager sub-group to review
 - May remove and send to parking lot
- 2.4.3.4.2 Management of Untrustworthy Devices
 - **Action:** Patrick Chan to update need
 - This applies to devices within the connected intersections (e.g., TMS, transportation field cabinet, etc..) and not OBUs/MUs
 - **Action:** Patrick Chan/AJ Lahiri to add need
 - RSU needs access to the SCMS or a credentialing system
 - This allows the RSU to verify the trustworthiness of the data

2.5 Operational Policies

- Christina Spindler mentioned it section should discuss agency policy in addition to law
- Policies may be more restrictive than law
- Barbara Wendling suggested replacing law with framework as no single entity governs.
- **Action:** Patrick Chan Add "While developers were conscience of the need for guidance that is feasible and implementable, certain technologies may not be available giving resource constraints."

2.6 Discussed operational scenarios

- 2.6.2.7 could use graphics

2.7 Relationship to the ITS National Architecture

- **Action:** Patrick Chan Need to highlight what parts are within scope. Add positioning reference and data source (SU-04?)

2.4.4 Testing Needs

- 2.4.4.1
 - John Kenney expressed concern over including term conformance in guidance
 - Patrick Chan said people need to check if they are following guidance even if it is not a standard
 - Better word desired but “conformance” is the best term to use

Adjourned 5:35 PM

Day 3

Reconvened and call to order at 11:33 AM

Roll Call of Committee. A quorum was present.

Siva Nara reviewed ITE Anti-Trust Guidance.

Resumed walking through testing and conformity needs

- 2.4.4.3 Testing and Conformity Scope Overview
 - **Action:** Patrick Chan to update Testing & Conformity Scoping Matrix per comments in walkthrough workbook
 - Application data needs will be defined but will not be done by Testing TF
 - **Action:** Traffic Controller Task Force to write requirements that identify data bits from NTCIP 1202

2.8 Testing and Conformity Verification Management

- **Action:** Patrick Chan replace “IOOs need” with “CI Testing Methodology”
- 2.8.3 Level of Testing
 - Needs more levels
 - Unit Testing, Integration Testing, Field Testing
 - Refer to NTCIP guide
 - Move to Parking Lot
- 2.8.5 Requirements Verification Methods
 - **Action:** All TFs must select a verification method for each requirement
 - **Action:** Patrick Chan add definitions of each verification method

Next Steps

All walkthrough files will be posted on Teams.

ConOps to be updated. New version expected September 11.

Final ConOps expected October 5.

Begin Requirements Phase.

Meeting adjourned at 1:30 PM.

Meeting Agenda

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

Chat Log

Day 1

Ed Seymour (to All - Entire Audience): 12:02 PM: Yes, I expect IOOs to reference this document in a procurement.

Alan Clelland (to All - Entire Audience): 12:05 PM: This is the role of TS10. Agenceis should be using TS10 for procurement guidance.

Alan Davis (to All - Entire Audience): 12:16 PM: Isn't the logic that most of the concepts of RLVW scale out to numerous safety and mobility applications?

Steve Sill (to All - Entire Audience): 12:18 PM: Roy - Request to join the queue

Blaine Leonard (to All - Entire Audience): 12:18 PM: It seems that a solution will be to say ". . ." from an interoperable connected intersection so safety applications can be developed for production vehicles, with an initial focus on the Red Light Violation Warning application.

Douglas Tarico (to All - Entire Audience): 12:19 PM: This sounds good, RLVW by itself is too narrow.

Deborah Curtis (to All - Entire Audience): 12:22 PM: May I join this queue too?

Ralph Boaz (to All - Entire Audience): 12:22 PM: Like Blake's comment.

Ralph Boaz (to All - Entire Audience): 12:25 PM: Blaine not Blake.

JOHN THAI (to All - Entire Audience): 12:26 PM: OK Deb

JOHN THAI (to All - Entire Audience): 12:29 PM: "safety and mobility applications can be developed..." This is a high level ConOps document after all.

Ralph Boaz (to All - Entire Audience): 12:29 PM: I believe that we need a few sentences of Normative/Informative. It comes up later but it is already used in the title of this section. It is especially important since this is not a standard. A non-standard can still have Normative/Informative but this is different.

Ken Yang (to All - Entire Audience): 12:30 PM: Can we think it different way? by re-group CI functions as "basic configuration" and "advanced configuration" which will reflect the fundamental inter-operability demands and the application specific interoperability demands

Ralph Boaz (to All - Entire Audience): 12:44 PM: I have been muted!

Raj Ponnaluri (to All - Entire Audience): 12:45 PM: Agree; this document need not be a catch all. May be a question... does not need to be answered but to think about... How does this work distinguish itself given the interesting title of the effort "Connected Intersections"... "what can IOOs do with this document" etc. I don't need to speak.

JOHN THAI (to All - Entire Audience): 12:46 PM: Get ready Jay.

Blaine Leonard (to All - Entire Audience): 12:50 PM: Good summary of the discussion, Roy. I think the language we have here covers the two perspectives.

Barbara Wendling (to All - Entire Audience): 12:54 PM: one editorial correction: The struck word "requirements" in the first sentence needs to be unstruck (otherwise no object for "performance")

Alan Clelland (to All - Entire Audience): 1:04 PM: My audio is not working, apparently. I just wanted to point out that confirmation that the received message agrees with the broadcast has been addressed by the Testing and Conformance Task Force.

Barbara Wendling (to All - Entire Audience): 1:05 PM: another editorial correction: "e) Third-part data providers" should be "third-PARTY data providers"

Kevin Balke (to All - Entire Audience): 1:06 PM: What about correction data?

Kevin Balke (to All - Entire Audience): 1:09 PM: Positioning was mentioned in the paragraph that has just rolled off screen

Kevin Balke (to All - Entire Audience): 1:10 PM: just trying to make it consistent

Kevin Balke (to All - Entire Audience): 1:12 PM: yes

Jean Johnson (to All - Entire Audience): 1:14 PM: Editorially, please do not write words in all caps, such as INFORMATIVE. All caps is perceived as SHOUTING at readers. Let's take a kinder, gentler approach, such as Informative throughout. This is consistent with TPG expectations.

David Benevelli (to All - Entire Audience): 1:18 PM: Terminology issue: The document will be discussing data "at rest" and "in motion" involving various devices. How will a reader be able to understand which of these "states" a data concept is in as it moves through the system and document?

Michael Stelts (to All - Entire Audience): 1:20 PM: GOOD IDEA, Jean.

JOHN THAI (to All - Entire Audience): 1:28 PM: Back at 1050 PST, 1350 EST

ITE Headquarters (to All - Entire Audience): 1:32 PM: Please mute your phone lines in the meantime.
Thanks

Blaine Leonard (to All - Entire Audience): 2:00 PM: These two paragraphs are quoted from an existing document- we can't really change the text here.

JOHN THAI (to All - Entire Audience): 2:06 PM: I can't see raised hand box so if you could alert me here.

Kevin Balke (to All - Entire Audience): 2:16 PM: I think as Jean suggests that the figure only tells half the story. Your original figure had the decoding and interpretation side of the process

JOHN THAI (to All - Entire Audience): 2:17 PM: It is more complete.

Kevin Balke (to All - Entire Audience): 2:19 PM: Not sure "positioning" is just a field component. It might be a "center" component as well.

Ralph Boaz (to All - Entire Audience): 2:21 PM: "back offices" in field should be "centers" according definition in "Center" in bullet above.

Barry Einsig (to All - Entire Audience): 2:23 PM: How do you do any of this piece with out setting minimum requirements for networking for Connected Intersection?

Jean Johnson (to All - Entire Audience): 2:23 PM: Hand Raised Re Figure 2, a) solid black line either identifies interfaces or "the system, not both; and b) MUs and OBUs need to be part of the Connected Intersection "system". If not, then you have defined a "signalized intersection," and there is nothing to which to connect.

Barry Einsig (to All - Entire Audience): 2:24 PM: completely agree Jean

Wolfgang Buckel (to All - Entire Audience): 2:28 PM: For simplicity, just add position correction to high precision position icon

Ray Starr (to All - Entire Audience): 2:29 PM: In you ARC-IT physical view in Figure 4 page 31 the field cabinet is called ITS Roadway Equipment and the RSU is called Connected Vehicle Roadside Equipment. Therefore, I would suggest not calling vehicles and pedestrians "Roadway" since usually the signal and RSU are the roadway. Call the vehicles and pedestrians Vehicle/Personal like the architecture does.

Randy Roebuck (to All - Entire Audience): 2:31 PM: Is RSU V2X Triangulation for position accuracy in-scope or out-of-scope?

Jay Parikh (to All - Entire Audience): 2:31 PM: Wolfgang, I agree with you. It's a functional depiction!

Faisal Saleem (to All - Entire Audience): 2:34 PM: Is there a value in indicating arrows for all interfaces shown in the diagram. For a new reader this may be helpful.

Wolfgang Buckel (to All - Entire Audience): 2:36 PM: Does red arrow need to be bi-directional to be open for later additions? Like TSP?

Ray Starr (to All - Entire Audience): 2:37 PM: The red arrow is one way for the purpose of this document.

David Benevelli (to All - Entire Audience): 2:40 PM: Please reconcile "Traffic Field Cabinet" in text vs. "Transportation Field Cabinet" in drawing.

Kevin Balke (to All - Entire Audience): 2:40 PM: use complete sentences in definitions

William Whyte (to All - Entire Audience): 2:40 PM: What does "primarily for security reasons" mean in that

para?

William Whyte (to All - Entire Audience): 2:40 PM: Suggest striking that phrase

Kevin Balke (to All - Entire Audience): 2:40 PM: For example: GNSS Receiver

Kevin Balke (to All - Entire Audience): 2:41 PM: "OBU may contain ..

Kevin Balke (to All - Entire Audience): 2:41 PM: Yes

Ralph Boaz (to All - Entire Audience): 2:41 PM: ON RSU def - say "OBUs, MUs and other...".

Ralph Boaz (to All - Entire Audience): 2:42 PM: On MU def - Eliminate last sentence. Its unnecessary.

Kevin Balke (to All - Entire Audience): 2:47 PM: I would suggest not using slang - like "low hanging fruit"

Alan Clelland (to All - Entire Audience): 2:48 PM: SOrry, audio issues. I agree with Ralph - remove it.

Kevin Balke (to All - Entire Audience): 2:51 PM: In my comments, I had suggested that you had more that architectural needs

Ralph Boaz (to All - Entire Audience): 3:00 PM: Def Uniform - remaining the same in all cases and at all times; unchanging in form or character.

Kevin Balke (to All - Entire Audience): 3:01 PM: All connected intersection need to provide a consistent (or uniform) representation of the situation and operating conditions.

Masoud Motamedi (to All - Entire Audience): 3:01 PM: Under architectural needs, is the expectation that every intersection provides a source for high precision positioning.

David Benevelli (to All - Entire Audience): 3:02 PM: Are we saying that for a given state, it is represented in a uniform way?

Ralph Boaz (to All - Entire Audience): 3:08 PM: Quality Assurance is not a good term here. Q/A is a management plan. This is Validation.

Wolfgang Buckel (to All - Entire Audience): 3:11 PM: Are we talking about a device like an MMU? Or verification / certification which ensures correct operation?

Kevin Balke (to All - Entire Audience): 3:12 PM: The CI needs to produce quality information. The information needs to produce the best set of messages (e.g., SPaT message) that represents the current situation and conditions at the intersection.

Randy Roebuck (to All - Entire Audience): 3:13 PM: Does Traffic Signal provide its "present state" feedback to TSC (controller)?

Venkat Nallamothu (to All - Entire Audience): 3:18 PM: Is "Robustness" analogous to "Resiliences"?

Alan Clelland (to All - Entire Audience): 3:19 PM: Randy, the status of the traffic signal aspect is on the output switch of the TSC it is not "feedback" from the signal aspect/head itself.

Venkat Nallamothu (to All - Entire Audience): 3:20 PM: In that case, should "resilience" be included elsewhere?

Michael Clifford (to All - Entire Audience): 3:21 PM: Resilience is the ability of a system to respond to perturbations and restore an acceptable level of functionality, within an acceptable time limit

Ralph Boaz (to All - Entire Audience): 3:21 PM: • Robust - degree to which a system or component can function correctly in the presence of invalid inputs or stressful environmental conditions (ISO/IEC/IEEE 24765:2017 Systems and software engineering-Vocabulary)

Kevin Balke (to All - Entire Audience): 3:23 PM: yes

Ralph Boaz (to All - Entire Audience): 3:29 PM: Resilience

The ability to continue to:

Operate under adverse conditions or stress, even if in a degraded or debilitated state, while maintaining essential operational capabilities; and

recover to an effective operational posture in a time frame consistent with mission needs

Ralph Boaz (to All - Entire Audience): 3:29 PM: Another def...

Ralph Boaz (to All - Entire Audience): 3:29 PM: The ability to quickly adapt and recover from any known or unknown changes to the environment through holistic implementation of risk management, contingency, and continuity planning

Randy Roebuck (to All - Entire Audience): 3:29 PM: V2X OTA messages were created to be compact and resulted in SAE J2735 and SAE J2945 standards.

JOHN THAI (to All - Entire Audience): 3:30 PM: 15 minute break. Back at 1245 PST.

Michael Clifford (to All - Entire Audience): 3:32 PM: I would add Message Authenticity to 2.4.2.1.2: A connected intersection needs to provide assurances that the data provided by the infrastructure is authentic. That is, that the data actually comes from the source that it is intended to come from.

William Whyte (to All - Entire Audience): 3:41 PM: We have trustworthiness requirements later down --

there's a bit of overlap between the security requirements and the correct operation requirements
Ralph Boaz (to All - Entire Audience): 3:41 PM: Compact Messages in not a user need (in an SE sense). It is part of a solution to a user need and expressed as a requirements or design of the messages.

Kevin Balke (to All - Entire Audience): 3:43 PM: comment on compact message. As worded, this is a limiting need. The CI needs to produce a CONCISE message describes the situation. A "long" message may be needed to adequately describe a situation. You cannot sacrifice "accuracy" for "compactness." Not all messages needs need to be the same. Messaging needs to be done in the most efficient manner to support the applications service by the CI.

Ray Starr (to All - Entire Audience): 3:47 PM: Compact Messages was an attempt to reverse engineer some of the requirements in the CCI. CCI says nodes need to be offsets rather than lat/long, for example.

Faisal Saleem (to All - Entire Audience): 3:47 PM: I have to hop to another meeting in few minutes.

Regarding 2.4.2..1.5 Coverage - Speed? Design, posted or operating.

Ray Starr (to All - Entire Audience): 3:51 PM: Coverage was also an attempt to reverse engineer the CCI and SPaT Verification requirement for 300 M coverage.

Randy Roebuck (to All - Entire Audience): 3:52 PM: Maximum speed of intersection as in-scope such as 80 MPH / 120 Km/h changes radio properties?

Barry Einsig (to All - Entire Audience): 3:52 PM: that depends on too many variables to define

Alan Clelland (to All - Entire Audience): 3:54 PM: It should be Operational Limit not Coverage.

Barry Einsig (to All - Entire Audience): 3:57 PM: also vehicle type and breaking distance

Ralph Boaz (to All - Entire Audience): 3:59 PM: 1.8 SPaT Message and Roadway Indications Synchronization

The connected intersection needs to provide SPaT information that is synchronized with signal indication changes on the roadway within a defined tolerance. For safety and effectiveness, applications require consistency between the perceived state of the intersection by road users and the state received via a SPaT message by the applications. Synchronization enables applications to safely and effectively provide services to road users.

Ralph Boaz (to All - Entire Audience): 4:00 PM: 1.9 Timeliness of Intersection Change in State Information

The connected intersection needs to provide a SPaT information with a low latency response to the changes in the state of the intersection. Applications need timely change in state information in order to provide effective and reliable services that aid road users.

Wolfgang Buckel (to All - Entire Audience): 4:01 PM: low latency is better

Wolfgang Buckel (to All - Entire Audience): 4:01 PM: concrete max latency should be left of requirements phase

Alan Clelland (to All - Entire Audience): 4:03 PM: WE are discussing latency .. this is what needs to be addressed in the requirements

Barbara Wendling (to All - Entire Audience): 4:04 PM: editorial correction: there should be a 'd' on synchronize

Ralph Boaz (to All - Entire Audience): 4:10 PM: The connected intersection needs to be synchronized to a common time reference both internally with its components and externally with the applications that use SPaT and MAP data. This time synchronization allows the connected intersection components to understand timing events shared between them and enables applications that use the data to understand the relevancy to their functions.

Ray Starr (to All - Entire Audience): 4:13 PM: Is this real time kinematic really a need, or would it become a requirement? Is there an underlying need?

Ralph Boaz (to All - Entire Audience): 4:16 PM: Sounds like a requirement.

Ralph Boaz (to All - Entire Audience): 4:21 PM: 1.2 SPaT Message Based on Current Intersection Configuration and Conditions

The connected intersection needs to provide SPaT information that is based on the current state of the intersection. The fields of the SPaT message reflect the current active time of day plan, the traffic signal controller's signal timing configuration, the active intersection demand, and timing of the intersection. For example, this means that a predicted change in signal indications within a SPaT data is based on the configuration and conditions at the moment. This convention provides for a more consistent interpretation of SPaT information by the applications that use the data.

Barbara Wendling (to All - Entire Audience): 4:27 PM: editorial suggestion: for the example just added, remove the two intermediate uses of "mode" and juts add "mode" at the end

Jean Johnson (to All - Entire Audience): 4:38 PM: at 2.4.2.3.3, you need some commas (separating series). That's why it looks like a run-on.

Wolfgang Buckel (to All - Entire Audience): 4:39 PM: 2.4.2.3.3 and 2.4.2.3.4 appear to be too detailed for needs

Wolfgang Buckel (to All - Entire Audience): 4:40 PM: They're at the level of SPaT message parameters content

JOHN THAI (to All - Entire Audience): 4:43 PM: 5

Jean Johnson (to All - Entire Audience): 4:46 PM: WRT end time for MON, fine with 5pm; however, TUE and WED end times are 5:30pm EDT, per MSOutlook appointment. FYI. Pls clarify. thanks.

Christina Spindler (to All - Entire Audience): 4:54 PM: We're almost completely accuated.

Day 2

ITE Headquarters (to All - Entire Audience): 11:18 AM: Welcome we will get started at 11:30a ET

ITE Headquarters (to All - Entire Audience): 11:19 AM: We will be going until 5:30p ET today

JOHN THAI (to All - Entire Audience): 11:31 AM: I can't see the raised hands.

polly okunieff (to All - Entire Audience): 11:39 AM: do you want to include tsp in the time change details?

Kevin Balke (to All - Entire Audience): 11:41 AM: I'm not sure what this is saying. Why you would "partially" satisfy a need for a particular intersection user?. The CI needs to completely satisfy the needs for all user. Separate data elements may be needed for differently intersection users. Because these needs are different by user type, the CI needs to report intersection information that is spedific to the user time. For example, VRU (and I'm assuming you mean pedestrian) needs to report information specific to the pedestrian indications (Walk, Flashing Don't Walk, Steady Don't Walk). If the intersection support specific bicycle applications (or phasing), the CI needs to produce a SPAT that is for this user classs, Same fo transit (queue jump situation). The point is signal groups and movement states need to be specific to a user type.

polly okunieff (to All - Entire Audience): 11:43 AM: and also preemption for rail, emergency/first responders

Barry Einsig (to All - Entire Audience): 11:43 AM: It's all versions of Priority, Transit, Freight, and Public Safety

Michael Stelts (to All - Entire Audience): 11:46 AM: Don't we also have a need that the RLVW implementation doesn't preclude SRM and SSM?

Ray Starr (to All - Entire Audience): 11:52 AM: The traffic signal does not know when an OBU is in range.

Kevin Balke (to All - Entire Audience): 12:04 PM: im fine

ITE Headquarters (to All - Entire Audience): 12:08 PM: For note taking please identify yourself when speaking. Thanks

Douglas Tarico (to All - Entire Audience): 12:11 PM: Is uniformity/consistency of the time change information covered somewhere? I think one of the objectives is to ensure different vendors provide similar time change information in similar scenarios.

Patrick Chan (to All - Entire Audience): 12:14 PM: Hi Doug. The answer is yes.

Ralph Boaz (to All - Entire Audience): 12:27 PM: For Confidence Factor, suggest "Some applications, such as safety applications, depend on tming information with high certainty."

Jingtao Ma (to All - Entire Audience): 12:31 PM: confidence levels ARE used, for example in the Audi Traffic Light Info service. so some OEMs use it.

Barry Einsig (to All - Entire Audience): 12:37 PM: are we still talking about a UDP message, that has no guanantee to be delivered and no acknowledgedment?

Kevin Balke (to All - Entire Audience): 12:39 PM: Would the need be The CI needs to communicate with a level of confidence (or certainty) it has to the vehicle.

Kevin Balke (to All - Entire Audience): 12:42 PM: Do we have a need that says all applications use a common time source? Or is this a requirement?

Patrick Chan (to All - Entire Audience): 12:45 PM: Kevin: the time source was one of very first needs.

Barbara Wendling (to All - Entire Audience): 12:46 PM: Re OEM making a vehicle motion control command based solely (or even mostly) on a SPaT message, consider whether or not the message-issuing entity is willing and able to accept the liability associated with issuing false information (whether incorrect content, or "merely" out-dated or unavailable): is the message-issuing enty prepared to accept all liability for teh vehicle

Kevin Balke (to All - Entire Audience): 12:49 PM: The true need is that the CI needs to ensure that the

MAP information that is being broadcast to the vehicle reflects the current operating state used to generate the SPaT. SPaT and MAP cannot be viewed as independent, but then BOTH need to reflect the actual usage. The timing plan and the operating geometry HAVE to be agreement. If an entity changes the timing plan, the design geometry environment reflect in the signal time ALSO needs to be changed.

Ralph Boaz (to All - Entire Audience): 12:53 PM: 1.8 SPaT Message and Roadway Indications Synchronization

The connected intersection needs to provide a SPaT message that is synchronized with signal indications change on the roadway within a defined tolerance. For safety and effectiveness, applications require consistency between the perceived state of the intersection by road users and the state received via a SPaT message by the applications. Synchronization enables applications to safely and effectively provide services to road users.

Patrick Chan (to All - Entire Audience): 12:58 PM: On break. Back at 1:20 PM.

Matt D'Angelo (to All - Entire Audience): 1:30 PM: Great point Bob.

Kevin Balke (to All - Entire Audience): 1:37 PM: Why would these not be the same? Just say regulatory speed limit. What do you post as the speed limit for a left-turn pocket or an exclusive right turn lane? You can't make a turn at the speed limit? What do I put for pedestrians movements (55 mph?) What if I have exclusive bicycle lanes? What if I want to change the assumed speeds to account for different weather conditions.(if it is snowy, do I want the vehicle to be making decisions based on the speed limit?) What might be more appropriate (given the ITE Signal change interval discussion) would be the assumed operating speed (which might often be the 85th percentile speed) use in computing the vehicle change interval. What is I've set the progression on a corridor for a specific speed (25 mph). Would that be the more appropriate speed to broadcast?

Peter Jager (to All - Entire Audience): 1:38 PM: How about the status of the lane?

Peter Jager (to All - Entire Audience): 1:38 PM: We have arterial flex lanes that change direction and from thru to two-way It

Ralph Boaz (to All - Entire Audience): 1:51 PM: 2.4.3.1.1 Should separate the specific need and the rationale separately.

Ralph Boaz (to All - Entire Audience): 1:52 PM: Cyberattack is two words.

James Alfred (BlackBerry) (to All - Entire Audience): 1:53 PM: change provide to process

James Alfred (BlackBerry) (to All - Entire Audience): 1:53 PM: one s

James Alfred (BlackBerry) (to All - Entire Audience): 1:53 PM: one less s

James Alfred (BlackBerry) (to All - Entire Audience): 1:54 PM: "do no provide" should be "do not process"

Ralph Boaz (to All - Entire Audience): 1:57 PM: Cyber Attack - Mzade up of a) Identify

- b) Protect
- c) Detect
- d) Respond
- e) Recover

Christina Spindler (to All - Entire Audience): 2:13 PM: No worries! It was the shuffling paper and the talking/sighing. It was like dueling banjos with the conversation. :)

Christina Spindler (to All - Entire Audience): 2:14 PM: (apologies for the everyone comment)

Barry Einsig (to All - Entire Audience): 2:16 PM: for 2.4.3.2.1 & 2 are both of these bi directional? Or only braoadcast?

Ed Leslie (to All - Entire Audience): 2:18 PM: great example!

Kevin Balke (to All - Entire Audience): 2:59 PM: for c) "No single entity governs ...

Kevin Balke (to All - Entire Audience): 3:04 PM: Is this just a US document?

Alan Clelland (to All - Entire Audience): 3:05 PM: Did we skip (d)?

Michael Maile (to All - Entire Audience): 3:07 PM: Patrick, the correct citation for ISO 21448 is ISO/PAS 21448:2019

Barry Einsig (to All - Entire Audience): 3:10 PM: We can not discuss price on this call

Kevin Balke (to All - Entire Audience): 3:59 PM: if you are going to require someone to satisfy "selected optional requirements" to claim conformance, doesn't that make it a mandatory requirement?

Douglas Tarico (to All - Entire Audience): 4:00 PM: Maybe I missed this, but since this is not a standard, is it relevant to talk about "conformance"?

Thomas M Kurihara (to All - Entire Audience): 4:01 PM: One aspect at issue is that standards are not implemented for interoperability. Implementation is using standards conforming devices , not standards.

Confused.

Thomas M Kurihara (to All - Entire Audience): 4:04 PM: Conformance statement could be rephrased to devices that conform to standards such as J2735.

Kevin Balke (to All - Entire Audience): 4:10 PM: What about "satisfy the requirements of the CI?"

Kevin Balke (to All - Entire Audience): 4:13 PM: not relevant now

Kevin Balke (to All - Entire Audience): 4:15 PM: End time associated with intervals not phases

Thomas M Kurihara (to All - Entire Audience): 4:19 PM: "...exchange of devices conforming to specified standards and technical elements identified..."

Thomas M Kurihara (to All - Entire Audience): 4:21 PM: 2.4.4.2.5

Kevin Balke (to All - Entire Audience): 4:22 PM: Why does SCMS not go inside CI diagram? Are we going to require testing of SCMS?

Thomas M Kurihara (to All - Entire Audience): 4:29 PM: Is 2.4.4.3.1 a list assumptions that clarify or provisions that apply to the sub clause above. If assumptions, need to reword entire list.

Michaela Vanderveen (to All - Entire Audience): 4:30 PM: So what will happen if the message signature fails, say certificate is expired? Does that pass the test for the data?

William Whyte (to All - Entire Audience): 4:31 PM: audio is spotty for me sorry

Kevin Balke (to All - Entire Audience): 4:31 PM: Discussion has addressed my comment

Kevin Balke (to All - Entire Audience): 4:35 PM: Doesn't the RSU talk to the GNSS?

Kevin Balke (to All - Entire Audience): 4:36 PM: if the center produces a SPaT, the field controller may have right SPaT

Kevin Balke (to All - Entire Audience): 4:37 PM: may not have right SPaT

Barry Einsig (to All - Entire Audience): 4:39 PM: You need to route at that location

Kevin Balke (to All - Entire Audience): 4:54 PM: I don't understand assumption that pedestrians activate crosswalks manually.

Alan Davis (to All - Entire Audience): 4:57 PM: Should it read "may act as a radio proxy?"

Kevin Balke (to All - Entire Audience): 5:13 PM: I would agree with Jean. You have to "unpack" the data to see that the content is consistent.

ITE Headquarters (to All - Entire Audience): 5:33 PM: 1 hour per page

Day 3

Patrick Chan (to All - Entire Audience): 11:25 AM: be back in 2.

Ray Starr (to All - Entire Audience): 11:49 AM: Does PSID apply to C-V2X also, or only to DSRC?

Kevin Balke (to All - Entire Audience): 11:50 AM: I thought we had a requirement that said the the MAP and SPAT have to be synchronized.

Kevin Balke (to All - Entire Audience): 11:51 AM: How would you know the synchronization is achieved if you don't test MAP in realtime?

Wolfgang Buckel (to All - Entire Audience): 11:51 AM: Is testing going to cover correctness of timing data in SPAT as provided by a signal controller?

Patrick Chan (to All - Entire Audience): 11:51 AM: Kevin: Yes, we have a need that MAP and SPaT has to be synchronized.

Kevin Balke (to All - Entire Audience): 12:03 PM: RLWV Application resides in vehicle. Are we application conformance?

Kevin Balke (to All - Entire Audience): 12:09 PM: I don't understand why we would have to do a RLWV Application Conformance test as ALL the data element is used in the application are in the SPAT?

Patrick Chan (to All - Entire Audience): 12:12 PM: Kevin - Though I'm not the expert, the intention is to test that the CI PROVIDES the data elements needed/required in the proper format by the RLWV application.

Jean Johnson (to All - Entire Audience): 12:14 PM: At Other Interfaces, in table. Change NTCIP 1202 v03 to NTCIP 1202 v03A. Also, change NTCIP 1218 to NTCIP 1218 v01. Version is critical. Specifically, there is probably no point in testing against NTCIP 1202 v02, since many of the needed "connected" objects are not present in NTCIP 1202 v02, but are in v03A. Let's be clear.

Alan Davis (to All - Entire Audience): 12:45 PM: Does this testing approach exclude deployments that use the RSU as an immediate forward device, where the traffic signal controller is generating the spat message?

Jay Parikh (to All - Entire Audience): 12:49 PM: Yes. I agree.

Jay Parikh (to All - Entire Audience): 12:49 PM: Will capture that in guidance.

Jean Johnson (to All - Entire Audience): 12:51 PM: At 2.8.2, start seeing "IOOs need to..". I don't think it is IOOs. Should be CI test methodologies need..."

Thomas M Kurihara (to All - Entire Audience): 1:13 PM: 2.8.5. Suggest adding IEEE 1012 as a reference even though it is not part of the recommended ITS JPO SE documents.

Thomas M Kurihara (to All - Entire Audience): 1:14 PM: Verification and testing are separable disciplines.

Thomas M Kurihara (to All - Entire Audience): 1:27 PM: Verification could be to determine and confirm requirements meets user needs within the context of the concept of operations? Determine what are essential for interconnection and exchange of data.

Thomas M Kurihara (to All - Entire Audience): 1:31 PM: 2.8.5.2 True for using single source for testing. Is third-party testing being considered?