METR
DEPLOYMENT

KENNETH VAUGHN

JIM MAROUSEK

14 December 2021   1

Welcome to the twelfth and final workshop on METR. Today we will continue to talk about METR deployment issues.

Agenda

- Overview
- METR Deployment: Part 2
  - Requirements
  - Heterogeneous Environments
  - Discovery Capabilities
  - Fake News
  - Remote Access
  - Compatibility
  - Inspections
- Details for Next Steps

14 December 2021   2

The topics today are listed on this slide

Acknowledgements

Small group has started structuring the problem

Editors
- Tom Lusco (US)
- Jim Marousek (US)
- Ken Vaughn (US)

Standards Process
- ISO/TC 204/WG 19
  - Drafting Team

Reviewers
- Kjersti Boag (NO)
- Jonathan Booth (UK)
- Knut Evensen (NO)
- Trond Foss (NO)
- Junichi Hirose (JP)
- Charles Karl (AU)
- Andy Lehrer (US)
- Per Lillestol (NO)
- Phillipe Mieybegue (FR)
- Fabrizio Paoletti (IT)
- Steve Sill (US)
- Suzanne Sloan (US)
- Takahiro Sugawara (JP)

14 December 2021   3

It is important to acknowledge that the materials developed to date represents a team effort. While there is a core editing group, as shown in the upper left, the concepts presented within this presentation already reflect valuable inputs from the review team shown on the right. In addition, the overall document is being prepared under the auspices of ISO/TC 204/WG 19, and especially its METR Drafting Team.

Before we begin, it is useful for everyone to understand the ground rules of our conversation. The development of the ConOps is intended to be a cooperative effort that reflects the input from stakeholders from different perspectives. To facilitate this process, the development team has prepared the workshops to gain feedback from stakeholders – but your feedback does not have to be limited to the topics presented.

The workshops are generally structured to present a topic and then gain feedback. Participants are welcome to voice their concerns during the workshop presentations, either verbally or using the chat window, but we request that verbal feedback is made when we are on discussion slides. We also recognize that our workshops are time limited and comments should be kept fairly concise. If major topics of discussion arise we can schedule additional meetings to focus on specific points, as needed. We have also established a discussion forum on the Github site to promote off-line conversations and encourage everyone to use the facility,

After we complete the workshops, we expect to prepare a draft ConOps early next year, and there will be ample opportunity for additional comments on the document once distributed.
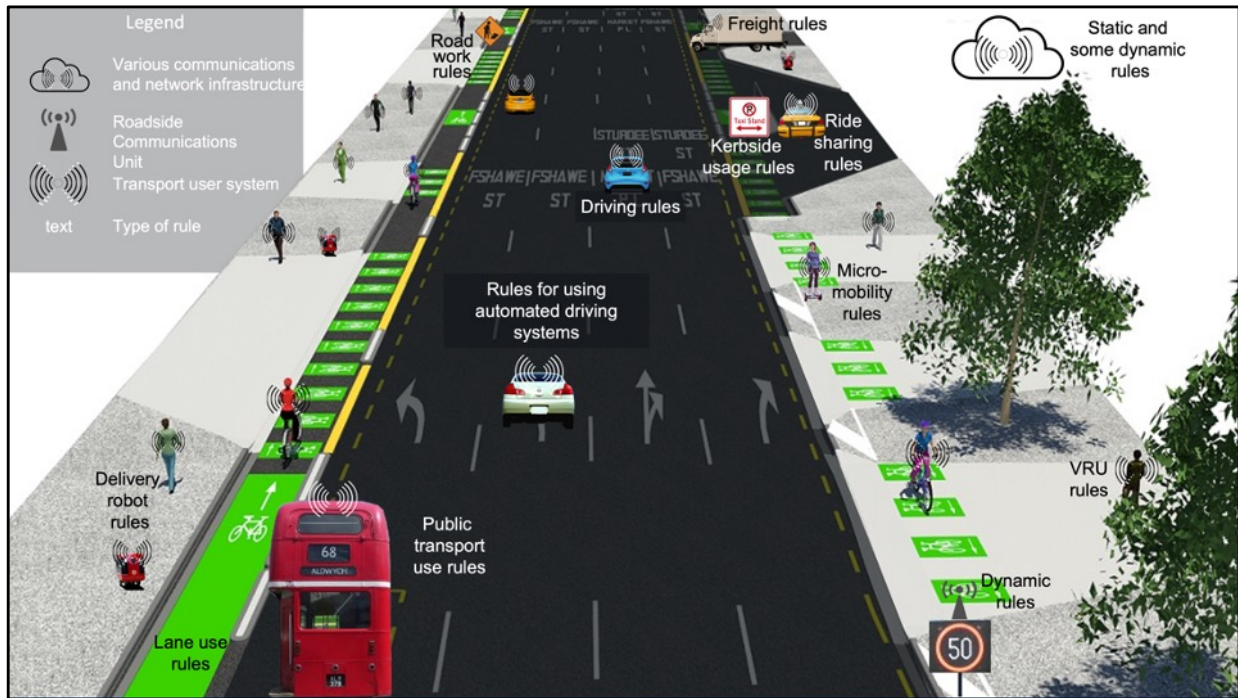
METR is intended to support all transport user systems. This includes: vehicle systems (e.g., automated driving systems and driver support systems), sidewalk delivery robots, and other devices such as smartphones used by pedestrians and perhaps units on-board micromobility devices (e.g., e-scooter interfaces)

The information provided to these users would potentially include all rules related to using the transport facilities, such as (from top and proceeding clockwise) any special rules for freight delivery or for the operation of heavy vehicles, kerbside usage rules (e.g., bus stop, taxi stand), ride sharing rules (e.g., what forms of ride sharing are allowed), micromobility rules (e.g., are e-scooters allowed in cycle lanes), VRU rules (e.g., is the sidewalk closed to pedestrians), dynamic rules (e.g., variable speed limits, lane control signals), public transport use rules (e.g., does my ticket quality me for a transfer, what are the fare zones), lane use rules (e.g., bike only, bus only, HOV-2), delivery robot rules (e.g., what is the maximum speed for a delivery robot for this sidewalk), road work rules (e.g., speed limit for the work zone). METR is intended to be flexible enough to address all of the transport rules, these are just a few examples that demonstrate the breadth of the effort.

Importantly, in order to cover all rules, the scope must include rules that can change

or be imposed in a dynamic fashion. For example, temporary lane closures due to unplanned incidents and signal timing information need to be considered and handled in a trustworthy way, even when long-range communications may not be available. Thus, the full scope of METR will likely need to rely on both cloud based delivery mechanisms as well as local broadcast of exceptional data.

Our first question today is whether METR might be a prerequisite for supporting other C-ITS operations.

https://www.pngall.com/certificate-template-png/download/14297

Our next question deals with the challenges of dealing with a mixed environment. For the foreseeable future, it is likely that there will be some regions that will support varied levels of METR information while other areas do not support METR at all. Likewise, some vehicles will not support METR receivers while other (e.g., ADS-equipped) vehicles might be dependent upon reliable METR information.

What challenges do we need to consider for this mixed environment?

Antique - https://cdn.pixabay.com/photo/2018/02/15/01/32/ford-3154262_960_720.png
Saab Aero - https://upload.wikimedia.org/wikipedia/commons/5/58/SAAB_AERO_X_Front_and_left_side.jpg
Tesla Cybertruck - https://upload.wikimedia.org/wikipedia/commons/0/0c/Tesla_Cybertruck_outside_unveil_modified_by_Smnt.jpg
Map - https://upload.wikimedia.org/wikipedia/commons/thumb/6/6c/Map_of_Maryland_highlighting_Montgomery_County.svg/800px-

Map_of_Maryland_highlighting_Montgomery_County.svg.png

Assuming that users need to be able to discover the level of support a jurisdiction has for METR, what level of specification is needed? For example, do jurisdictions need to be able to indicate support by
- Rule category
- Geofenced areas
- Classification of road
- Other?

https://cdn.pixabay.com/photo/2014/04/04/14/57/jigsaw-313585_1280.jpg

Does METR need to support a discovery mode? For example, this might be achieved by a translator sending out a fleet of specially equipped vehicles to capture as-built rule information or through crowd sourcing data from a large number of vehicles that are equipped with sufficient sensors to provide reports back to a central system.

Van -
https://upload.wikimedia.org/wikipedia/commons/thumb/d/d3/Waymo_Chrysler_Pacifica_in_Los_Altos%2C_2017.jpg/1200px-
Waymo_Chrysler_Pacifica_in_Los_Altos%2C_2017.jpg
Crowd source -
https://upload.wikimedia.org/wikipedia/commons/thumb/5/58/Crowdtesting.jpg/1200px-Crowdtesting.jpg

Fake News

- What protections does METR need to provide to prevent/recover from false regulatory information?

Restricted METR Access

14 December 2021   10

What protections does METR need to provide against computer hacking?

https://pngimg.com/uploads/hacker/hacker_PNG20.png

Is there a need for remote systems to gain access to METR information. For example, users about to initiate a long drive or legal teams determining information from a distance. Are there any restrictions on this type of data?

https://get.pxhere.com/photo/computer-keyboard-technology-chain-hammer-castle-security-padlock-law-pc-protection-password-protect-secure-multimedia-data-hacker-sure-computer-keyboard-trojan-privacy-policy-musical-keyboard-776893.jpg
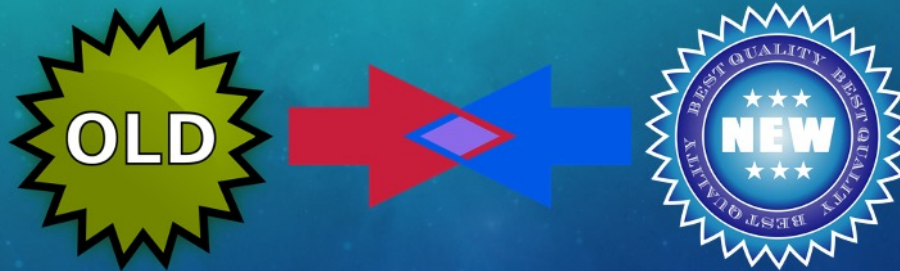
What considerations need to be made for the evolution of METR over time?

Old - https://upload.wikimedia.org/wikipedia/commons/thumb/4/45/Old_icon_shiny_badge.svg/1200px-Old_icon_shiny_badge.svg.png
Arrow - https://upload.wikimedia.org/wikipedia/commons/thumb/b/b8/Merge-short_arrows.svg/1024px-Merge-short_arrows.svg.png
New - http://www.pngall.com/wp-content/uploads/2016/05/Best-Quality-Free-PNG-Image.png

Finally, what requirements might exist for the support of METR and what impacts might these inspections have on vehicle inspections?

https://live.staticflickr.com/7402/10696057996_ae11cfab6f_n.jpg

NEXT STEPS

That completes our questions for Workshop 12.

Workshop Schedule

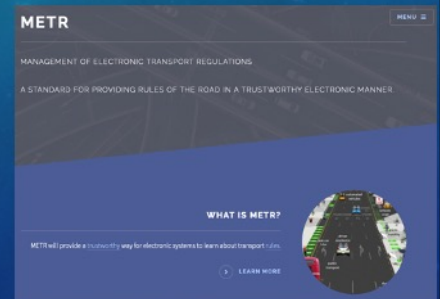| Date	Topic
28 September	METR operations
5 October	METR operational structure
12 October	Electronic regulation life cycle
19 October	Electronic regulation conflicts
26 October	Vehicle operations
2 November	Vehicle information needs
9 November	Campus governance
16 November	Campus regulations
23 November	Roadwork and emergency operations
30 November	Multimodal and micromobility operations
7 December	METR deployment: Part 1
14 December	METR deployment: Part 2

We've now completed all of our workshops in the series.

The focus of our efforts will now largely shift to the website through the discussion forum. The draft content of the ConOps will be posted online and the discussion forum will provide opportunities for people to provide their input.

At the same time, we plan to conduct continued outreach to experts, especially to communities that had little to know participation in our workshops. Finally, countries are encouraged to hold their own regional workshops and to provide their input.

This slide provides an example of the layout that we are using to capture the summary points from our workshops and from other submittals. Each summary point is documented along with its source (e.g., workshop number) and a more detailed reference (e.g., slide number). The summary point is automatically assigned a unique identifier that indicates the type of entry (e.g., "SP" for summary point) and an integral number. Finally, the summary points can be linked to draft content within the ConOps. In this case, SP-2 is "reflected in" A-4. By clicking on the A-4 on the website, the user is taken immediately to that entry in the "Assumptions/Constraint table.

Sample Linked Assumption

24315-1 METR ConOps-A: Assumptions

✳ ID	☰ Description	🔗 Links	⚙ Clause
A-2	Transport user systems that support METR need to be able to operate along side transport user systems that do not support or are not connected to METR	➡ SP: SP-3 Some users might not be connected to MET…	6.6.1.6
A-3	Sufficient communication bandwidth will be available among the various back-office systems to support METR operations.		6.6.1.1
A-4	All road vehicle systems that support METR will support short-range wireless communications meeting local standards (e.g., DSRC, LTE-V2X)	➡ SP: SP-2 Road vehicles should support short-range… SP-45 The preferred implementation is that a u…	6.6.1.2 Clause in ConOps

Current draft of text for ConOps

Links forwards and backwards

14 December 2021   18

Each piece of text that is targeted for inclusion in the ConOps can be seen as a separate entry along with its unique identifier and its clause number and the reverse link to the source of the information.

It should be noted that at this time, the text is often in an very draft form akin to brainstorming, but this will evolve over the next several months.

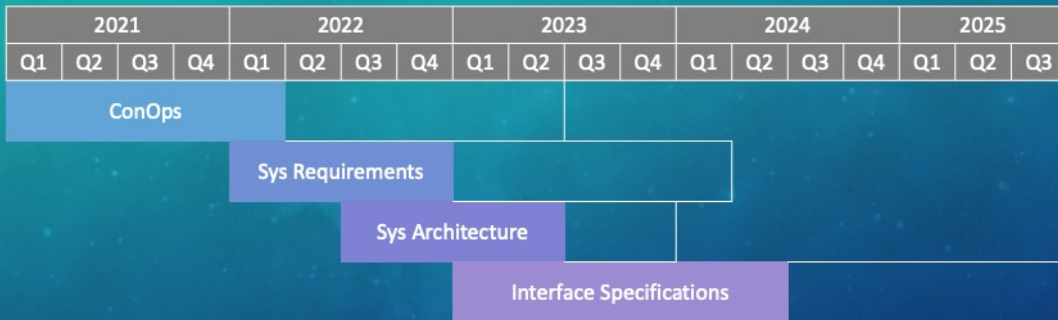This slide presents a lost of projects that we will coordinate with along with a list of stakeholder perspectives that we will seek additional input from.

This slide shows the schedule that we have advertised for a while and indicates that we hope to have a ConOps draft in early 2022, whereupon it will start the standardization process (of multiple reviews prior to standardization)

Schedule for Part 1: ConOps

ConOps Activity	Start – Finish
Initiate effort (PWI)	January – February 2021
Prepare for stakeholder input	February – September 2021
Gather stakeholder input	October – December 2021
WG 19 Meeting	December 13, 2021
Incorporate input into draft	December 2021 – March 2022
Drafting team review	February – March 2022
WG review / Finalize Form 4	March – May 2022
Early 2022 Plenary	May 2022?
NP/CIB ballot	May – July 2022
Disposition of comments	July – September 2022
Late 2022 Plenary	October 2022?
DTS ballot	September – January 2023

14 December 2021   21

A more detailed schedule is provided on this slide. This schedule might be optimistic as it shows a single CIB review and shows the ConOps completing standardization in January 2023; if we need a second CIB, the schedule would need to be extended to the mid 2023 timeframe as suggested by the previous schedule slide.

More information about the project and the latest developments are posted on our GitHub site. This includes a PDF of each workshop presentation as well as a disposition of each comment submitted via the chat log. In addition, the website includes a listing of all of the key summary points coming out of these workshops and other inputs into METR; each of these points are then traced to specific items to be incorporated into the draft ConOps. Further input on this draft material can be provided through the discussion forum on the site.

https://upload.wikimedia.org/wikipedia/commons/thumb/2/24/Cartoon_Guy_In_Deep_Thought_Using_A_Computer.svg/1200px-Cartoon_Guy_In_Deep_Thought_Using_A_Computer.svg.png