



ROADWORK & EMERGENCY OPERATIONS

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Welcome to the ninth workshop on METR. Today we will talk about roadwork and emergency operations.

Agenda

- Overview
- Roadwork and Emergency Operations
 - Process to Deploy New Rules
 - Roadwork Access
 - Temporary Lane Markings
 - Weather Operations
 - Locally Imposed Rules
 - Evacuations
 - System Reliability
- Next Steps

The topics today are listed on this slide

Acknowledgements

Small group has started structuring the problem

Editors

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Standards Process

- ISO/TC 204/WG 19
 - Drafting Team

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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.

Ground Rules

- METR is very complex and involves many disciplines
- Workshops are based on this structure and designed to receive feedback
- If you have comments, please voice your concerns
 - Verbally (and concisely) during discussion slides (marked with  icon)
 - Using chat window
 - Using discussion forum (<https://github.com/ISO-TC204/iso24315p1/discussions>)

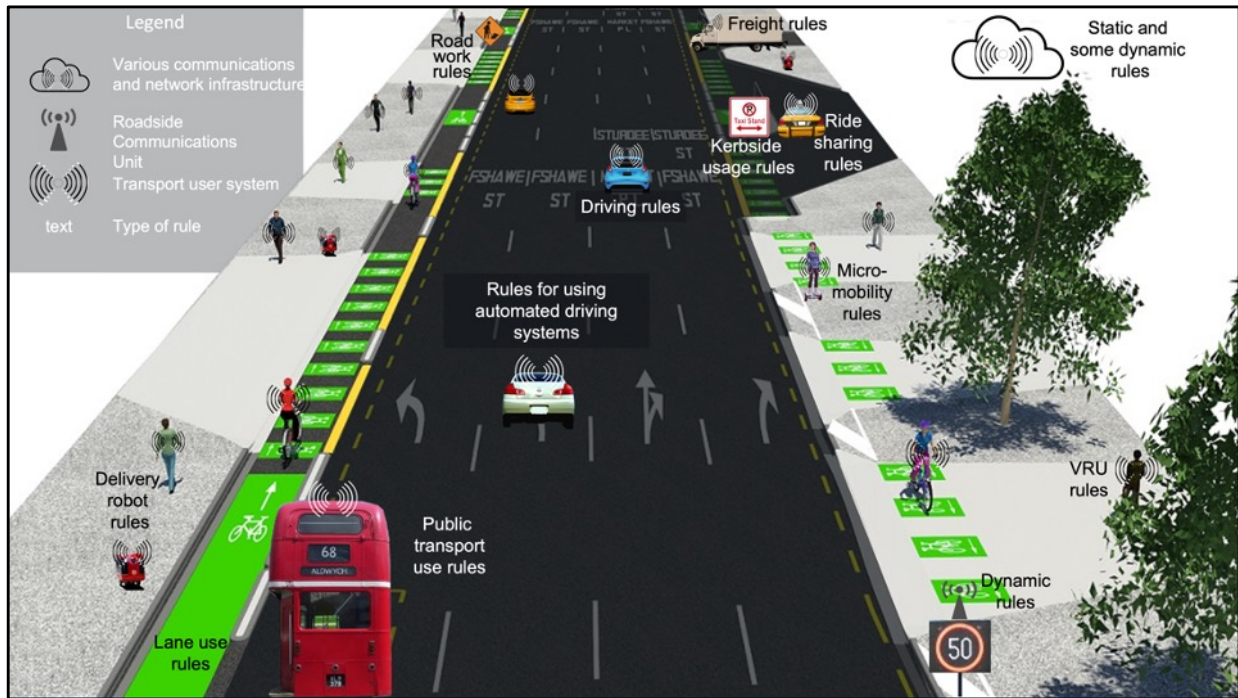
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Before we begin, it is useful for everyone to understand the ground rules of our conversation. The development of the ConOps is intended to be a cooperative effort that reflects the input from stakeholders from different perspectives. To facilitate 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 qualify 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.

Process to Deploy New Rules

- What assumptions need to be made about the order in which the business of infrastructure management works? For example, is it appropriate to assume that new rules will first be announced in METR (with an expected date) before a physical sign being posted with a final METR update indicating that it is now in effect?



The first question for discussion today deals with what assumptions need to be made about the process to implement a new rule (e.g. installing a new sign).

Roadwork Access

- What regulatory information needs to be conveyed to allow construction vehicles to enter a work zone while banning normal vehicles?



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Within work zones, some signs relate to accessing the work zone itself. Does METR need to support any specific features related to these types of rules?

CV Only sign - <https://www.signsworldwide.com/images/detailed/4/Construction-Vehicles-Only-sign.jpg>

Work zone - https://freesvg.org/img/ryanlerch_Workman_Ahead_Roadsign.png

CV2 Only Sign - <https://www.myparkingsign.com/CST/Construction-No-Parking-Signs>

Temporary Lane Markings

- What special regulatory information needs to be conveyed for traffic lanes that are in the process of being shifted as a part of road works (i.e., the deployment of temporary lane markings, etc)



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Within work zones, lanes are often shifted to allow for proper worker safety distances. The pavement markings can often be confusing as to which is considered the current markings versus the ones being overridden. Is this issue within the scope of METR, and if so, what features does METR need to support to handle these details.

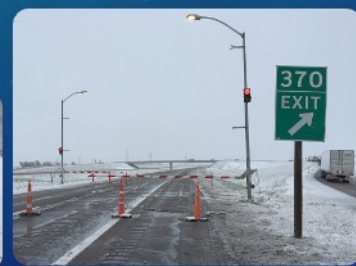
Intersection - https://www.workzonesafety.org/training-resources/fhwa_wz_grant/atssa_temporary_pavement_markings/

Carriageway - http://www.workzonesafety.org/training-resources/fhwa_wz_grant/atssa_temporary_pavement_markings

Faded markings - https://c1.staticflickr.com/7/6049/6235123387_f4479bda2f_b.jpg

Weather Operations

- What is the process of implementing weather-related rules? For example, snow starts falling, agency decide to require snow chains, eventually they close the passage except for escorted convoys of vehicles, eventually the entirely close the passage, they then reopen the passage to escorted convoys, they then reopen to vehicles with snow chains, and finally reopen to normal operations



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Some rules are implemented in stages. For example, this slide shows how a facility might transition from normal operations to road closure. What features does METR need to support to allow for this type of operation?

Emerg Snow Route sign –

<https://www.signoutfitters.com/EmergencySnowRouteNoParkingIfOver2InchesSign18x24.aspx>

Lights Raining sign –

<https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r1r2edition.pdf>

Chain sign - <https://www.flickr.com/photos/curtiserry/7086781795>

Dynamic chain sign -

[https://upload.wikimedia.org/wikipedia/commons/a/a6/Chains_required_\(4046720333\).jpg](https://upload.wikimedia.org/wikipedia/commons/a/a6/Chains_required_(4046720333).jpg)

Police vehicle - <https://www.flickr.com/photos/sgreenepx/23978673723/>

Snow swing gate -

https://upload.wikimedia.org/wikipedia/commons/thumb/f/f7/2015-05-09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg/1200px-2015-05-

09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg

Locally Activated Rules

- Does METR need to disseminate rules that are activated by local law enforcement? For example, a police officer closing a road that is equipped with a gate for that function or the imposition of snow chain requirements where signs already indicate that such policies may be enforced.



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When rules are activated locally (e.g., deployment of an existing gate or message sign), how should METR respond?

Emerg Snow Route sign –

<https://www.signoutfitters.com/EmergencySnowRouteNoParkingIfOver2InchesSign18x24.aspx>

Dynamic chain sign -

[https://upload.wikimedia.org/wikipedia/commons/a/a6/Chains_required_\(4046720333\).jpg](https://upload.wikimedia.org/wikipedia/commons/a/a6/Chains_required_(4046720333).jpg)

Police vehicle - <https://www.flickr.com/photos/sgreenepx/23978673723/>

Snow swing gate -

https://upload.wikimedia.org/wikipedia/commons/thumb/f/f7/2015-05-09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg/1200px-2015-05-09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg

Ad-Hoc Rules

- Is there a need to support a local regulator, such as a police officer, imposing an ad-hoc rule, such as redirecting traffic due to an incident?
- How should a user system determine precedence among ad-hoc rules and static/temporary rules?



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How does METR become aware of and publicize ad hoc rules?

https://s0.geograph.org.uk/geophotos/05/01/17/5011714_afb0a475.jpg

Compromises to Infrastructure

- Does METR need to accommodate rules related to compromised infrastructure (e.g., collapsed bridge, flooded road, avalanche covered roadway) that are longer term?



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Are there any differences that need to be considered when facilities are closed for a long period?

Tacoma Narrows - https://thumbs.gfycat.com/CoordinatedImpossibleFlycatcher-size_restricted.gif

I-35 bridge, Minneapolis -

https://upload.wikimedia.org/wikipedia/commons/thumb/6/6b/I35_Bridge_Collapse_4crop.jpg/800px-I35_Bridge_Collapse_4crop.jpg

Road closed sign -

https://upload.wikimedia.org/wikipedia/commons/1/18/Road_closed_sign_winter.jpg

Flooded road - <https://www.flickr.com/photos/mysticwales/2372892853>

Evacuation Rules

- Does METR need to accommodate rules for evacuations?



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Should METR address evacuation scenarios? For example, should it address the definition of evacuation zones, evacuation routes, and traffic rules on those routes?

<https://www.saccounty.net/news/latest-news/PublishingImages/PointPleasantEvacNotification02102017.png>

Overriding Traffic Control Devices

- To what extent should METR accommodate situations when normal rules do not apply due to special circumstances, such as driving on the wrong side of the freeway during an evacuation scenario, i.e., a higher priority rule?



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To what extent does METR need to deal with rules that override other rules (e.g., reversible flow lanes, perhaps due to an uncommon evacuation scenario)?

<https://upload.wikimedia.org/wikipedia/commons/thumb/5/52/I-93ContraflowLaneReversalConcordNH.jpg/275px-I-93ContraflowLaneReversalConcordNH.jpg>

System Reliability Needs

- Does METR need to remain operational in the midst of a major disaster to support (perhaps automated) emergency response equipment rushing to the scene? What constraints might this impose on the system?



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How stable and resilient does the METR network need to be? What happens if METR information is not available and how critical is it during times of disaster?

bridge -

https://upload.wikimedia.org/wikipedia/commons/9/9d/Bay_Bridge_collapse_2.jpg

flood -

https://upload.wikimedia.org/wikipedia/commons/5/50/Hurricane_Katrina_Flooding.jpg

wildfire - https://gamepedia.cursecdn.com/pwi_gamepedia_en/d/d0/Wildfire.png



NEXT STEPS

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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

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We've now completed 9 of our 12 workshops. Our next workshop will focus on roadwork and emergency operations

Workshop 10 Topics

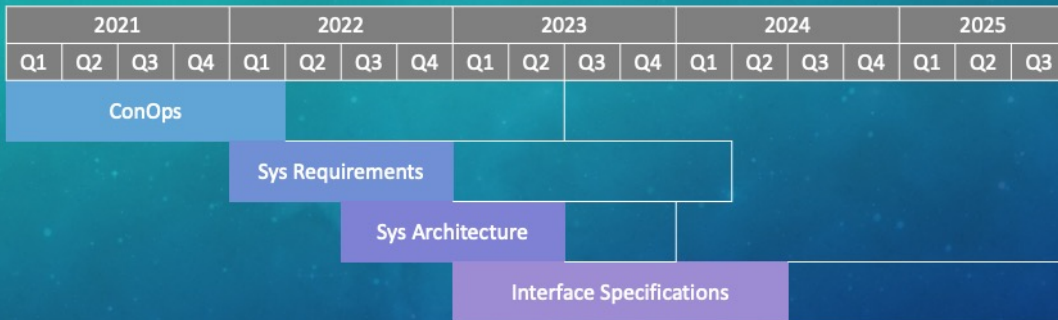
- Multimodal and Micromobility Operations
 - Sidewalk and kerbside operations
 - Public transport rules
 - Kerbside interfaces
 - Disability needs
 - Sidewalk automation rules

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The next workshop will focus on the topics shown on this slide

Tentative Schedule



- End of task shown at expected committee draft
- Transparent bar shows standards review and approval process
- System architecture is expected to be online only (i.e., it will use a shorter review process)
- Interface specification are expected to enhance existing standards

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As a reminder our current expected timeline is shown here. We hope to have a ConOps draft in early 2022, whereupon it will start the standardization process (of multiple reviews prior to standardization)

More Information

More information and a discussion forum is available at:

<https://iso-tc204.github.io/iso24315p1>



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More information about the project and the latest developments will be posted on our GitHub site. This will include a PDF of weekly presentation files to be posted after our meetings each week.

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