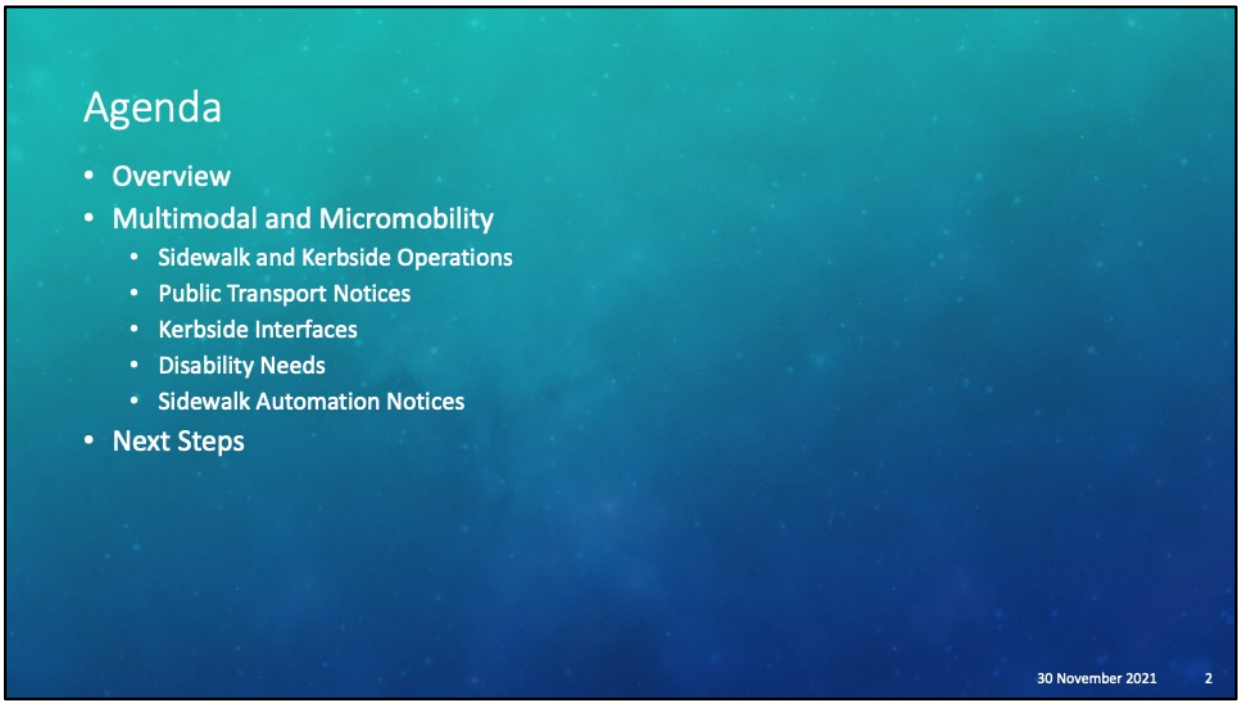
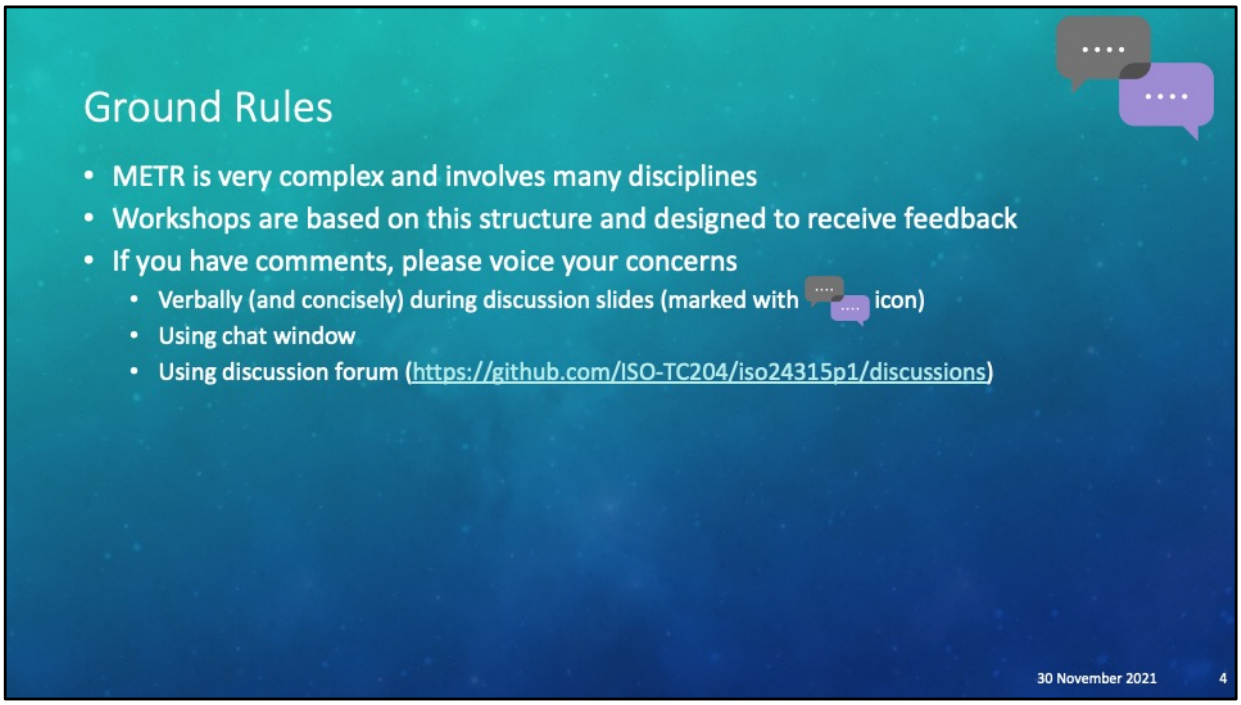
Welcome to the tenth workshop on METR. Today we will talk about multimodal and micromobility operations.



The topics today are listed on this slide

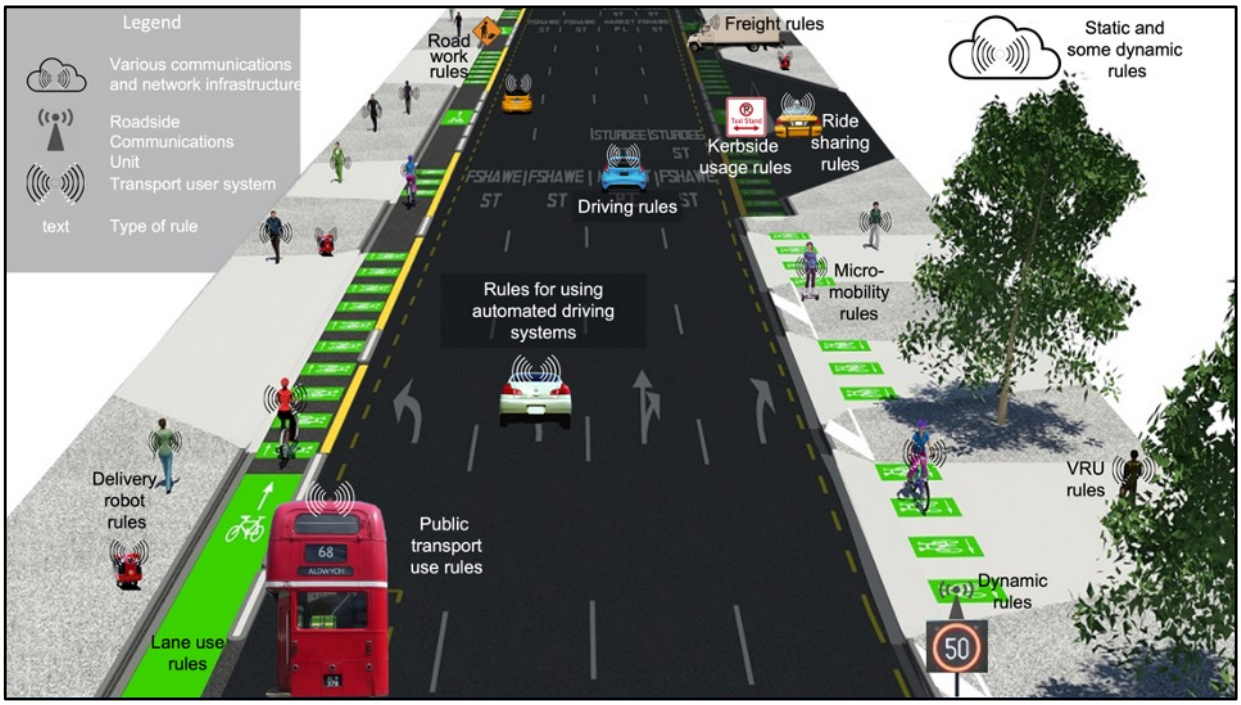
It is important to acknowledge that the materials developed to date represents a team effort. While there is a core editing group, as shown in the upper left, the concepts presented within this presentation already reflect valuable inputs from the review team shown on the right. In addition, the overall 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.

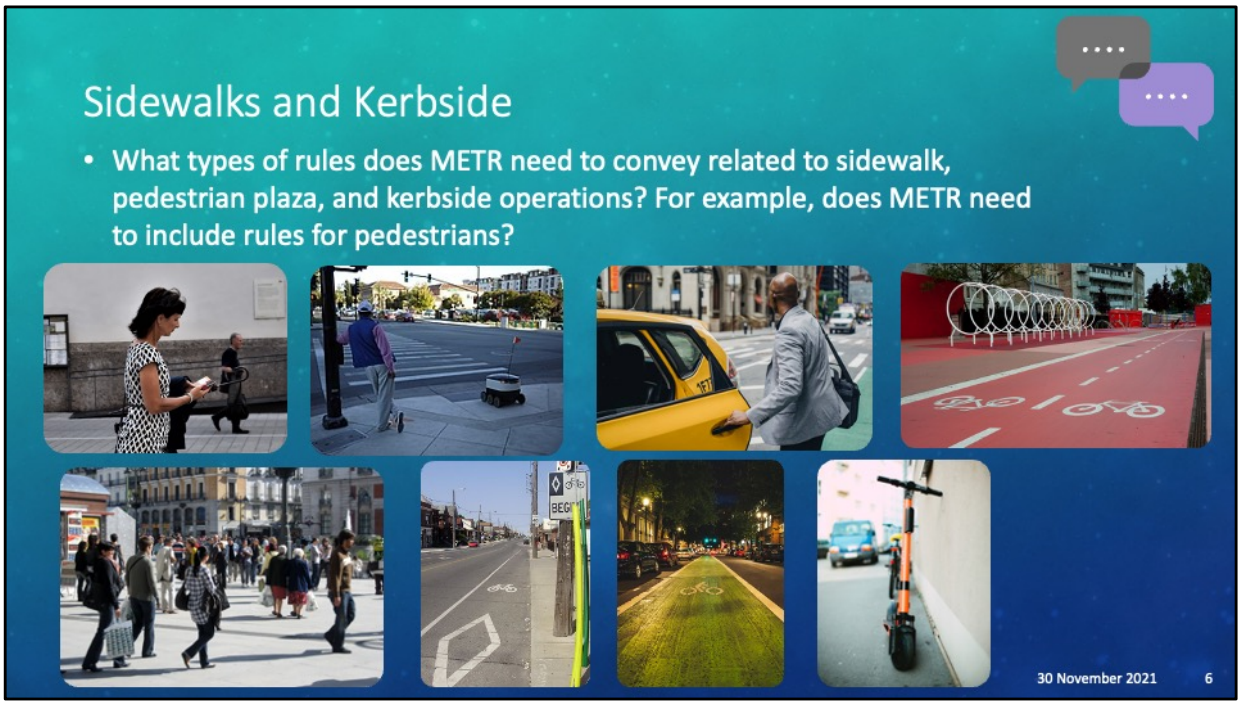


METR is intended to support all transport user systems. This includes: vehicle systems (e.g., automated driving systems and driver support systems), sidewalk delivery robots, and other devices such as smartphones used by pedestrians and perhaps units on-board micromobility devices (e.g., e-scooter interfaces)

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, what do users of the sidewalk environment need from METR. In particular, do pedestrians need to have access to any information (e.g., on their smartphones) or do we think this is unnecessary.

Pedestrian - https://images.unsplash.com/photo-1597177574273-b391da2b9b25
Pedestrian Plaza - https://c1.staticflickr.com/3/2468/4072267091_6882e0cc6f_b.jpg
Man and bot - https://upload.wikimedia.org/wikipedia/commons/thumb/6/6b/Man_and_delivery_robot_waiting_at_pedestrian_crosing_in_Redwood_City%2C_California.jpg/220px-Man_and_delivery_robot_waiting_at_pedestrian_crosing_in_Redwood_City%2C_California.jpg
Taxicab - https://www.pexels.com/photo/faceless-black-man-opening-taxi-door-on-busy-street-5648413/
E-scooter - https://images.pexels.com/photos/3671151/pexels-photo-3671151.jpeg?auto=compress&cs=tinysrgb&dpr=2&h=650&w=940
Basic Bike Lane - https://commons.wikimedia.org/wiki/File:Rogers_Road_Bike_Lane.jpg
Green bike lane - https://images.pexels.com/photos/3256031/pexels-photo-3256031.jpeg?auto=compress&cs=tinysrgb&dpr=2&h=650&w=940

Red bike lane - https://upload.wikimedia.org/wikipedia/commons/e/e7/Red_bikeway_in_Copenhagen%2C_Denmark.jpg

In relation to public transport, what types of rules does METR need to distribute? Does it need to distinguish exactly what is meant by a "bus lane" (e.g., what types of buses are allowed)

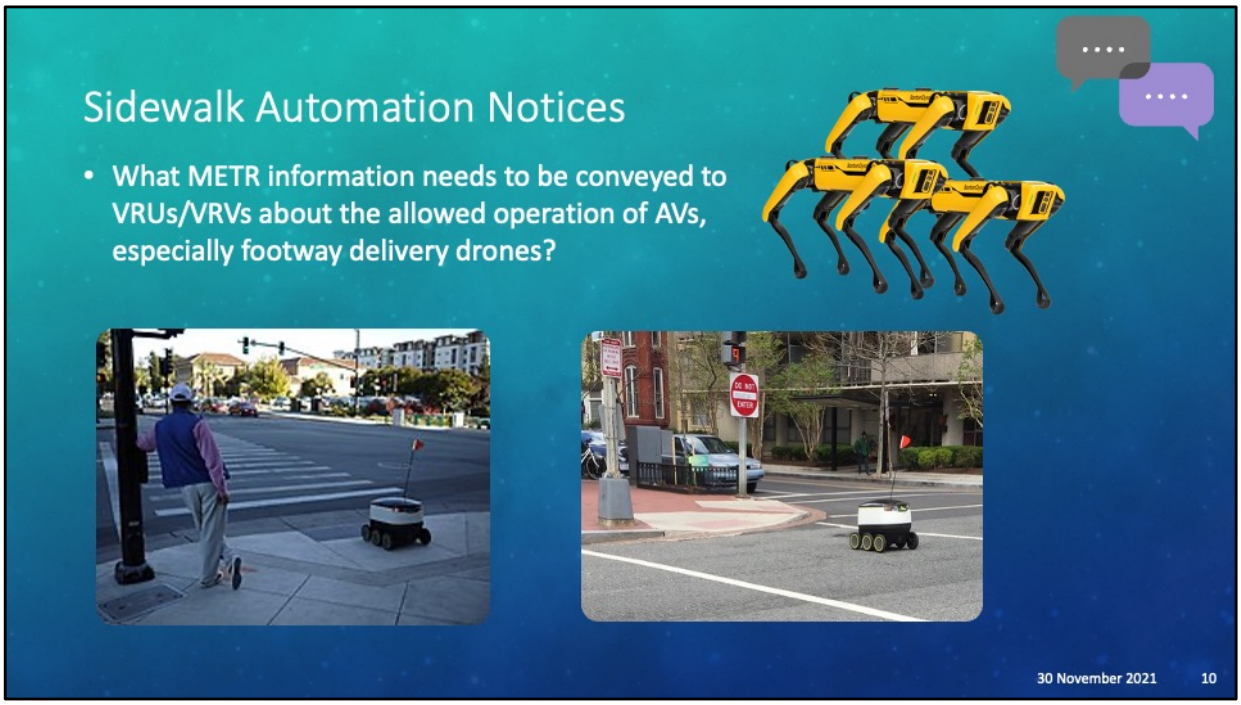
Charter Bus - https://upload.wikimedia.org/wikipedia/commons/thumb/4/46/Passengers_exiting_a_Michaud_charter_bus%2C_circa_1970.jpg/1280px-Passengers_exiting_a_Michaud_charter_bus%2C_circa_1970.jpg
Blocked Bus Lane - http://www.streetsblog.org/wp-content/uploads/2016/11/bus-lane-fail.jpg
Big Bus - https://live.staticflickr.com/2922/34000474355_3b0b095071_n.jpg

Our next topic relates to kerbside rules. What information do users need to properly operate vehicles next to the kerbside? Who needs these rules?

Rubbish bins - https://bugwoodcloud.org/images/1536x1024/5493634.jpg
Car/Hydrant - https://www.flickr.com/photos/elyaqim/11411879293/
Load Only - https://www.flickr.com/photos/sdot_photos/25357601701/
Air Port Dropoff - https://www.flickr.com/photos/davidericksON/2593436903/in/photostream/
Slug Lane - https://upload.wikimedia.org/wikipedia/commons/d/d3/Slug_Line.gif
App Ride User - https://images.pexels.com/photos/1386649/pexels-photo-1386649.jpeg?auto=compress&cs=tinysrgb&fit=crop&h=627&w=1200
App Ride Stop - https://travelshopgirl.com/wp-content/uploads/2017/04/image_2017-04-29-113131-0000_11-1024x768.jpg
Van Pool - https://localwiki.org/media/cache/94/71/94710c960f754fa6e1f4f80865fba19a.png
Taxi Passenger - https://images.pexels.com/photos/6280698/pexels-photo-6280698.jpeg?auto=compress&cs=tinysrgb&dpr=2&h=650&w=940

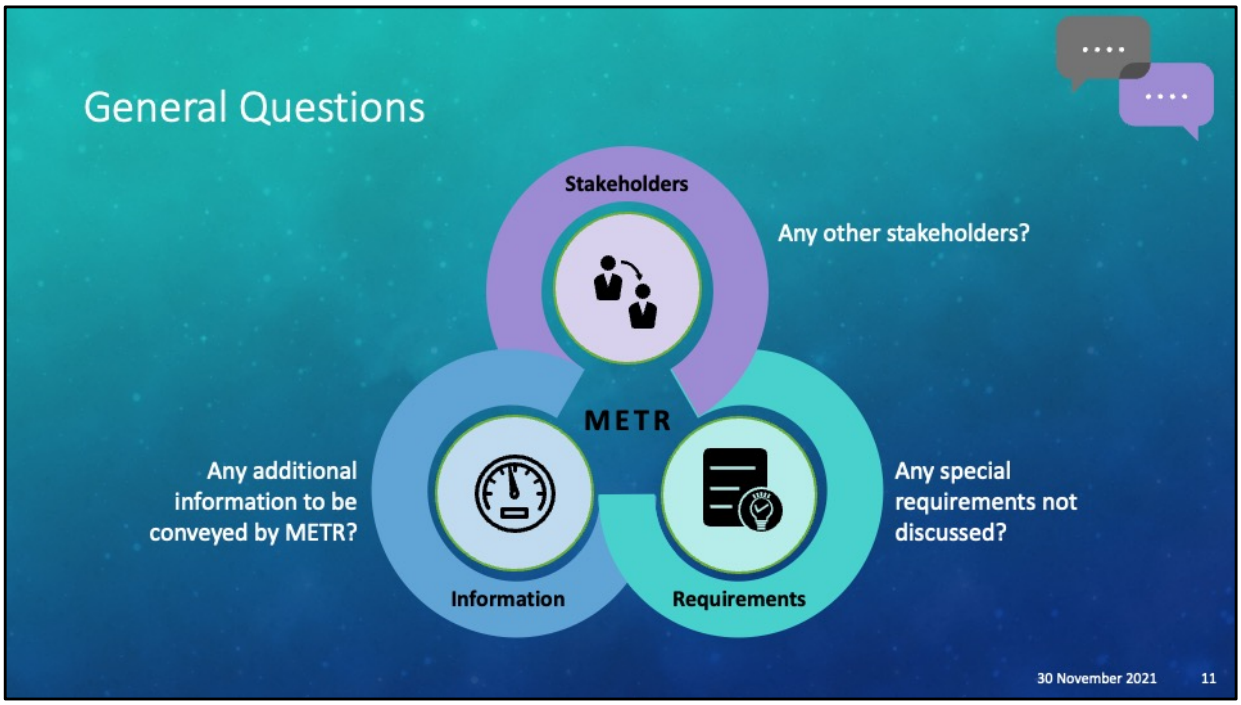
What are we missing so far in relation to specific categories of users? For example, are there additional rules that people with disabilities need to be aware of? For example, does METR need to indicate the position of accessibility features (ramps, loading zones)? Are there other needs to be considered?

Accessibility sign:
https://upload.wikimedia.org/wikipedia/commons/thumb/d/d0/Wheelchair_ramp_sign_.jpg/1200px-Wheelchair_ramp_sign_.jpg
Wheelchair accessible parking area:
https://upload.wikimedia.org/wikipedia/commons/thumb/5/51/Somewhat_Makeshift_Disability_Access_Ramps.jpg/800px-Somewhat_Makeshift_Disability_Access_Ramps.jpg
Wheelchair on bus -
https://www.flickr.com/photos/metrolibraryarchive/7298606182/in/photostream/



And what about sidewalk delivery robots. While these devices are just starting to emerge in the environment, it is expected that they will begin to become much more prevalent. What information do they need to operate and to what extent does METR need to alert other users that these types of devices are present?

Robo Dog - https://www.bostondynamics.com/sites/default/files/2021-02/spot-explorer-web-2.png
Man & bot - https://upload.wikimedia.org/wikipedia/commons/thumb/6/6b/Man_and_delivery_robot_waiting_at_pedestrian_crosing_in_Redwood_City%2C_California.jpg/220px-Man_and_delivery_robot_waiting_at_pedestrian_crosing_in_Redwood_City%2C_California.jpg
Bot in crosswalk - https://www.flickr.com/photos/joewarminsky/33858357395/

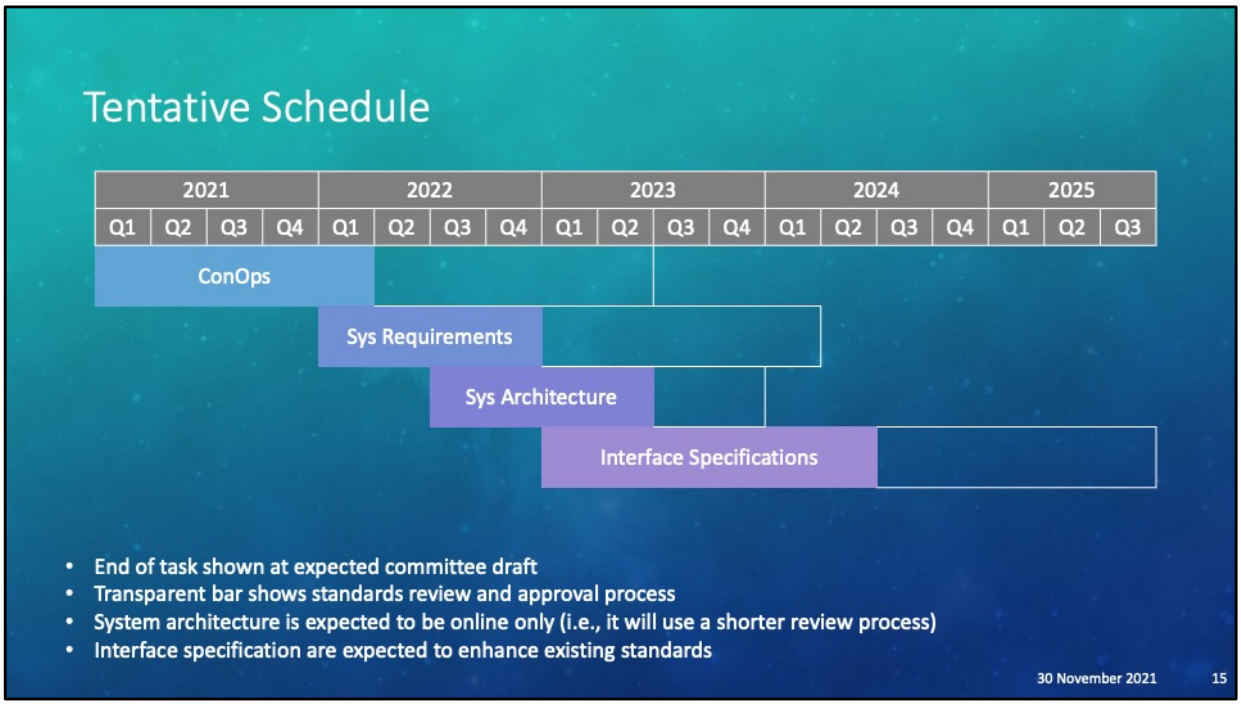


Finally, as a sanity check, are there other types of users or stakeholders that we need to be talking with? Are there other needs that we need to consider?

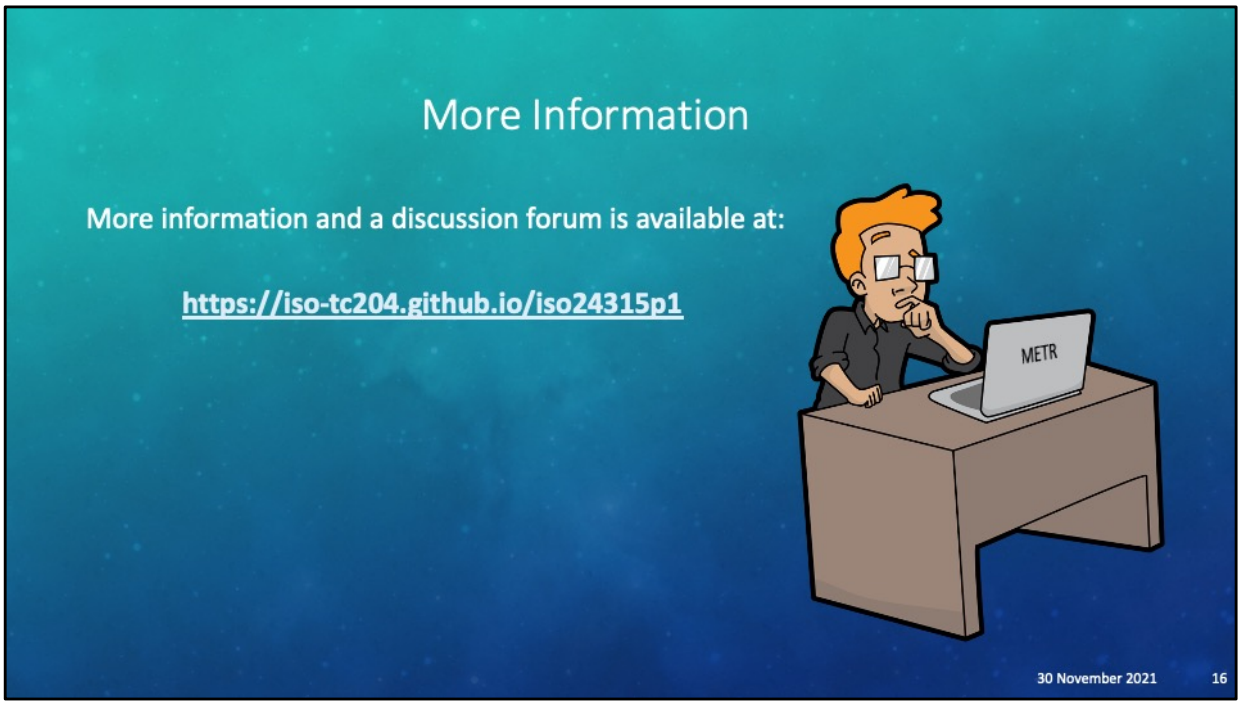
That concludes the meat of Workshop 10

We've now completed 10 of our 12 workshops. Our next workshop will focus on deployment

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



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 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