

**Symposium 2021 Breakout Session Title:
B106-Automated Driving System (ADS) Safety Metrics in Theory and Practice**

Session Contact/Organizers:

Members of the AV Safety Metrics Working Group from the TRB Committee on Vehicle-Highway Automation (ACP30), coordinated by:

- Laura Fraade-Blanar, Associate Policy Researcher, RAND Corporation,
- Jack Weast, Intel Fellow, Intel

Session Description

Infrastructure Owner-Operators (IOOs), regulators, researchers, enforcement organizations, the traveling public, and others need more clarity about the maturity and performance of Automated Driving Systems (ADS). While many industry-driven developments are emerging to offer new ideas about how to measure, report, and interpret ADS performance, there is not yet a sufficient basis of comparison with human driving safety nor consensus around the appropriate metrics and thresholds with which to do so.

This session seeks to initiate a collaborative conversation to establish the foundational elements necessary to advance this conversation.

Goals/Objectives/Outputs

- Define and disambiguate terms (e.g., ADS, metric and measure, framework, disengagement, crashes, average human drivers as comparisons, retrospective and prospective measures, etc.).
- Evaluate historical metrics and interpret emerging needs and measurement trends.
- Identify user groups and needs – federal regulators, state operators and enforcement, private sector, traveling public, etc. and challenges around communicating safety measures to said groups.
- Present industry and policy perspectives and updates.
- Facilitate a guided, but open discussion of the near-term opportunities and long-term gaps for the Working Group's research with a focus on moving from a safety metric ontology to taxonomy.

Agenda

I.What we talk about when we talk about metrics and frameworks? (40 Mins)?

- a. Presenters: Laura Fraade-Blanar, *RAND Corporation*, and Jack Weast, *Intel*
- b. Outline/Topics:
 - i. Introductions
 - ii. Summary of Working Group objectives and progress
 - iii. Overview of Session Agenda and connection to Safety Assurance sessions
 - iv. Define and disambiguate terms (ADS, metric, measure, framework, taxonomy, ontology, etc.)
 - v. Metrics for use today and tomorrow
 - vi. What already exists and what is needed
 - vii. Where do metrics fit within the frameworks
 - viii. Framework interoperability

II. What makes a Good Metric? (25 Mins)

- a. Presenters: Jessica Uggioni, UK Law Commission & Julie Evans, RS&H
- b. Outline/Topics:
 - i. Case Study: Disengagements and Miles Driven
 - i. Summarize current reporting requirements
 - ii. Synthesize historical data and industry trend
 - i. Highlight reporting discrepancies and differences in OOM
 - iii. What does the data tell us about ADS progress to date?
 - i. What has this (not) done for the public's technical literacy?
 - iv. What limitations/gaps do the existing metrics reveal?
 - i. Identify how reporting the frequency/quantity of Disengagements/Miles Driven alone have failed as a complete/sufficient metric
 - v. How can we modify/expand the data to support more useful analysis?
 - i. E.g., Disengagement conditions, underlying causes, counterfactual simulation results (severity of resulting crashes in scenario without disengagement)
 - ii. Conclusion/Discussion: What can be extrapolated from the Case Study to inform the development, application, reporting, and interpretation of future metrics?

III. Private Sector Perspectives (55 min)

- a. Facilitator: Ann Marie Lewis, Alliance For Automotive Innovation
- a. Panelists:
 - a. Jack Weast, Intel
 - b. Kris Kusano, Waymo
 - c. Amitai Bin-Nun, Motional
 - d. Kevin Gay, Aurora
 - e. Anthony D'Amato, Ford
 - f. Ed Straub, SAE
- b. Outline/Topics
 - i. How are ADS developers/providers utilizing safety metrics in their development and deployment processes?
 - ii. How can we make metrics better (more relevant to real-world safety and more palatable to non-technical users)?

IV. Public Sector Perspectives (55 min)

- b. Facilitator: Edward Griffor, NIST
- c. Panelist Categories:
 - i. Edward Griffor, NIST
 - ii. David Zuby, IIHS
 - iii. Shaun Kildare, Advocates for Highway and Auto Safety
 - iv. Bolin Zhou, International Alliance for Mobility Testing and Standardization (IAMTS)
 - v. Julia Friedlander or Kathryn Angotti, SFMTA
 - vi. Patrick Smith, NYC DOT
- d. Outline/Topics:
 - i. Role of metrics for public acceptance and regulatory approvals
 - ii. Government viewpoints on safety metrics; roles and responsibilities

V. Wrap-Up (5 min)

- a. Presenters: Laura Fraade-Blanar and Jack Weast

Related Sessions

AV Safety Assurance

NOTE: we will work with the organizers of the Safety Assurance sessions to ensure our content is complementary and not duplicative.