

# Automotive Ontologies

6th 2021 WG meeting

April 13, 2021

## Welcome

- A (possible) introduction of new participants
  - Quick recall of the scope of the previous call
1. Working on the „The Bag-of-Concepts” for the auto.schema.org expansion
  2. Source Nr 1: SAE Recommended Practice J3016 - SAE J3016
  3. Source Nr 2: Advanced Driver Assistant System Ontology (Ryutaro Ichise group)
  4. Source Nr 3: Traffic Incident Ontology (TIO) (P. Kulicki, R.Trypuz)
  5. A modified idea about our work on Autonomous Cars ontology
  6. Discussion – next steps

# The Bag-of-Concepts

# The Bag-of-Concepts

## The working model:

<https://docs.google.com/spreadsheets/d/17DU8B0fWMnT0fllsaZvOYkggw9QF97DyNiKgHA-HsGk/edit?usp=sharing>

Now about 70 candidates

Autonomous Vehicles Bag-of-Concepts for auto.schema.org extension

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|    | A                                     | B      | C   | D | E | F   |
|----|---------------------------------------|--------|---|---|---|---|
| 32 | ADS-DEDICATED VEHICLE                 | ADS-DV | A vehicle designed to be operated exclusively by a level 4 or level 5 ADS for all trips within its given ODD limitations (if any).  |   |   | Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles (SAE) |
| 33 | DISPATCHING ENTITY                    |        | An entity that dispatches an ADS-equipped vehicle(s) in driverless operation  |   |   | --"   |
| 34 | CONVENTIONAL VEHICLE                  |        | A vehicle designed to be operated by a conventional driver during part or all of every trip   |   |   | --"   |
| 35 | [DYNAMIC DRIVING TASK (DDT)] FALLBACK |        | The response by the user to either perform the DDT or achieve a minimal risk condition after occurrence of a DDT performance-relevant system failure(s) or upon operational design domain (ODD) exit, or the response by an ADS to achieve minimal risk condition, given the same circumstances               |   |   | Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles (SAE) |
| 36 | OPERATIONAL DESIGN DOMAIN             | ODD    | Operating conditions under which a given driving automation system or feature thereof is specifically designed to function, including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics. |   |   | --"   |
| 37 | LATERAL VEHICLE MOTION CONTROL        |        | The DDT subtask comprising the activities necessary for the real-time, sustained regulation of the y-axis component of vehicle motion   |   |   | --"   |
| 38 | LONGITUDINAL VEHICLE MOTION CONTROL   |        | The DDT subtask comprising the activities necessary for the real-time, sustained regulation of the x-axis component of vehicle motion   |   |   | --"   |
| 39 | MINIMAL RISK CONDITION                |        | A condition to which a user or an ADS may bring a vehicle after performing the DDT fallback in order to reduce the risk of a crash when a given trip cannot or should not be completed.   |   |   | --"   |
| 40 | DDT SYSTEM FAILURE                    |        | A malfunction in a driving automation system and/or other vehicle system that prevents the driving automation system from reliably performing the portion of the DDT on a sustained basis, including the complete DDT, that it would otherwise perform.   |   |   | --"   |
| 41 | MONITOR                               |        | A general term referencing a range of functions involving real-time human or machine sensing and processing of data used to operate a vehicle, or to support its operation.   |   |   | --"   |
| 42 |                                       |        | The activities and/or automated routines designed to assess whether and to what degree the user is performing the role specified for  |   |   | --"   |

# The sources

# Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles

[https://www.sae.org/standards/content/j3016\\_201806/](https://www.sae.org/standards/content/j3016_201806/)

- The Recommended Practice J3016 provides a taxonomy describing the full range of levels of *driving automation* in on-road *motor vehicles* and includes functional definitions for advanced levels of *driving automation* and related terms and definitions. This Recommended Practice does not provide specifications, or otherwise impose requirements on, *driving automation systems*.
- Standardizing levels of *driving automation* and supporting terms serves several purposes, including:
  - 1. Clarifying the role of the (human) *driver*, if any, during *driving automation system* engagement.
  - 2. Answering questions of scope when it comes to developing laws, policies, regulations, and standards.
  - 3. Providing a useful framework for *driving automation* specifications and technical requirements.
  - 4. Providing clarity and stability in communications on the topic of *driving automation*, as well as a useful short-hand that saves considerable time and effort.

# Advanced Driver Assistant System Ontology (Ryutaro Ichise group)

Presented in our last meeting

[https://www.researchgate.net/publication/286314022\\_Ontologies\\_for\\_Advanced\\_Driver\\_Assistance\\_Systems](https://www.researchgate.net/publication/286314022_Ontologies_for_Advanced_Driver_Assistance_Systems)

# Traffic Incident Ontology (TIO) (P. Kulicki, R. Trypuz)

Published at EDMC AUTO ontology site:

<https://spec.edmouncil.org/auto/ontology/DE/TrafficIncidents/>



# Previously identified sources:

The first candidates for sources of terms for the „bag of concepts“:

- Known vocabularies:

## AUTONOMOUS DRIVING GLOSSARY

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- [Autonomous Driving Glossary \(intel.com\)](#)
- [https://www.sae.org/standards/content/j3016\\_201806/](https://www.sae.org/standards/content/j3016_201806/)
- [19 Self Driving Car Terms You Really Need To Know – Gearbrain](#)
- [Alphabetical Glossary of Automotive Terms \(edmunds.com\)](#)
- [Autonomous vehicle technology Glossary \(driverless.global\)](#)
- [An Honest Glossary of Terms Relating to Self-Driving, Mobility, Tesla, and More \(thedrive.com\)](#)
- [AAMVA - Autonomous Vehicle Information Library](#)
- [Developing the Vocabulary of Autonomous Vehicles » Traffic Safety Resource Center \(trafficsafetystore.com\)](#)
- **Consultation with SEARCH ENGINES (SEO) Experts**

## Legal consequences of an increase in vehicle automation

[https://bast.opus.hbz-nrw.de/opus45-bast/frontdoor/deliver/index/docId/689/file/Legal\\_consequences\\_of\\_an\\_increase\\_in\\_vehicle\\_automation.pdf](https://bast.opus.hbz-nrw.de/opus45-bast/frontdoor/deliver/index/docId/689/file/Legal_consequences_of_an_increase_in_vehicle_automation.pdf)

## Automated Vehicle Research for Enhanced Safety - Final Report by the National Highway Traffic Safety Administration:

<https://www.regulations.gov/document/NHTSA-2014-0070-0003>

# A modified idea about our work on Autonomous Cars ontology

## Let's consider creation of Middle level reference ontology for Driving Automation Systems

- Before we cut it down to meet schema.org requirements
- Keep it simple and lightweight
- Make it as a companion to SAE J3016



## Next steps



**Thank you**

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