ASAM OpenSCENARIO v1.2.0

Release Presentation

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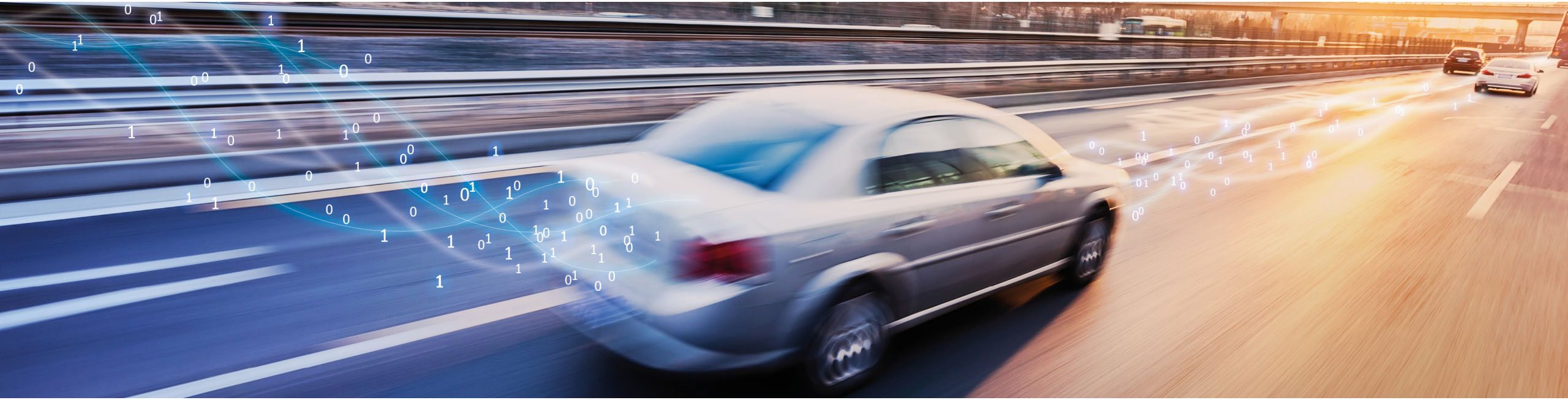

ASAM Association for Standardization of Automation and Measuring Systems

Agenda

1. Introduction
2. Motivation for new release
3. Change statistics
4. New features
5. Other changes
6. Backward-compatibility
7. Relation to other standards
8. Deliverables

Introduction

OpenSCENARIO is used for driving simulation and for virtual development, test and validation of driving assistance functions, automated and autonomous driving.

Within these use cases, OpenSCENARIO describes the dynamic content of the world, i.e. the entities acting on or interacting with the road network. OpenSCENARIO does not describe the road network, road infrastructure or road surface. A scenario can be part of a test case, can be created with a scenario editor and serves as input for driving simulators.

OpenSCENARIO was transferred to ASAM by an industry consortium in late 2018. ASAM OpenSCENARIO v1.2.0 is the result of the latest “OpenSCENARIO 1.x” project which started in September 2021.

Motivation for new release

Many driving simulator and scenario editor vendors have already made, are in the process of or are planning to make their tools compatible to the ASAM OpenSCENARIO 1 standard.

The project served to address the unclarities, errors and feature wishes by implementers.

Harmonization with the new OpenX standard ASAM OSI (driving simulator output) and with the existing ASAM OpenDRIVE standard was necessary.

Change statistics

~ 60 open issues at project start

~ 90 issues created during project

~ 70 issues addressed for OpenSCENARIO v1.2.0

~ 70 issues created and addressed during project internal review phase

~ 80 open issues remaining

New features

Support for virtual sensor recognition algorithm testing

- Reference to sky & illumination image
- More options for custom properties

Support for sensor error injection

- False positive / false negative for entities

Introduction of variables

- Separated concept from parameters
- Runtime changes & external access

Support for multiple controllers

- Lateral/longitudinal
- Two new controller types (animation / light)

Improvement in controller overrides

- Physical values
- Dynamic limitations (max rate, max torque)

New features

Vehicle role

- police, ambulance...

Light action

- Vehicle lights

Animation action

- Vehicle doors & pedestrian motions
- Reference to 3d animation files

Speed profile action

- For modelling of realistic speed profiles

Extended Traffic Swarm action

- Velocity range
- Direction of travel

Speed & acceleration condition

- per dimension (lateral, longitudinal, both)

Clearance condition

Other changes

Clarifications

- Coordinate systems & rotations
- Position types (esp. Road/Lane)
- Relative and absolute orientation in positions + defaults
- Speed (longitudinal/lateral domain)
- Distance calculations across several roads
- Route calculation
- Route assignment
- Closed trajectory
- Interfacing between scenario and test case / runtime environment
- Dynamic constraints of entities in actions
- Action prerequisites
- Add / remove entity actions

Other changes

Fixes

- integer -> int
- Gear number: double -> Auto: enum & Manual: int
- Overwrite -> override
- State machine states (standby vs. complete)
- GeoPosition in degree

Harmonization

- Introduced fractional cloud cover (OSI)
- Traffic signal controller (OpenDRIVE)

Backward compatibility

100% backward compatible to OpenSCENARIO v1.1.0

OpenSCENARIO v1.0.0 scenarios are still valid in the OpenSCENARIO v1.2.0 schema

Deprecation mechanism applied

Strict validation schema for v1.2.0 without deprecated elements

Relation to other standards

Logical road network

- ASAM OpenDRIVE
- HERE Navigation Data Standard (NDS)

Road surface elevation and friction

- ASAM OpenCRG

Driving simulator output

- ASAM OSI

3D models of road, scenery and objects

- CityGML
- OpenSceneGraph
- glTF (Khronos Group)
- FBX (Autodesk)
- 3DS (Autodesk)

Deliverables

Standard

- User Guide

Supplementary Files

- UML data model
- UML Model reference documentation
- XSD schema file
- Examples
- Migration files (v1.0.0 → v1.1.0, v1.1.0 → v1.2.0)
- UML modelling guidelines