ASAM 2020 / 2021+

Dr. Klaus Estenfeld Executive Director ASAM Japan G.K. June 29, 2021 Online Meeting





Association for Standardization of Automation and Measuring Systems



Who we are and what we do

- Non-profit standardization organization within the Automotive Industry
- Focus on implementation level standards (rather than the process level standards of e.g. ISO/SAE)
- ASAM standards are **recommendations**, they do not have an impact on regulatory framework
- **Open, non-competitive** standard development groups
- Membership driven standardization projects



ASAM The Organization



Board of Directors – Term 2021 - 2023

Voluntary Representatives from International OEMs, Tool Vendors and Research Institutes



Chairman

Prof. Dr. Marcus Rieker HORIBA Europe GmbH



Dr. René Grosspietsch BMW AG





Dr. Ralf Nörenberg HighQSoft GmbH



Armin Rupalla RA Consulting GmbH



Technical Steering Committee (TSC) – Term 2020 - 2022

A Highly Experienced International Team of Experts from the Automotive Industry



Gil Amid Foretellix Ltd.



Nicola Croce Deepen Al



Dr. Christoph Dallmayr Vector Informatik GmbH



Armin Graf Vitesco Technologies GmbH



Prof. Dr. Andreas Kemeny Driving Simulation Association



Oliver Philipp Siemens Industry Software GmbH



Stefan Romainczyk NI (Speaker)



Gerald Sammer AVL GmbH



Kilian Schnellbacher ETAS GmbH



Michael Schwarzbach BMW AG



Markus Steffelbauer Softing Automotive Electronics GmbH



Dr. Jörg Supke EMOTIVE GmbH & Co KG



Membership Development 2020/2021

2020 – The Highest Number of New Members per Year since the Foundation of ASAM

- As of December 31, 2020, 77 new members in 2020
- Highest membership ID on December 31, 2020: 569 (355 members)
- ASAM membership ID 500 in January, 550 in November
- 8 Honorary members
- Since January 1st, 2021, 28 new members in 2021



New ASAM Members in 2021

29 New Members as of Today





Membership Development

New Members: 2020 – the best year ever!



Total Number of Members per Year



Status: as of June 15, 2021



ASAM is a Truly International Association!

More Than Half of the ASAM Income Stems from Members Outside of Europe





ASAM Membership

More Than 360 Member Organizations Develop and Apply ASAM Standards

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Some Highlights (Last Twelve Months)

ASAM Actively Drives Its Evolution – Inside and Outside

- New Standards Related Activities
 - New Domain Simulation established, high interest worldwide
 - Five ASAM OpenX projects identified in Jan. 2019, first three ASAM releases in 2020
 - Currently, 9 ASAM OpenX projects (in total 21 standards development projects) running
 - High interest in standards development projects in the classic domains
 - First ASAM standard developed outside Europe, released in May 2020
- Next Steps towards Internationalization (members in 30 countries in 2020)
 - Local entry in China (C-ASAM), first Regional Meeting China in November
 - Re-vitalization of North American Activities, high interest in ASAM OpenX
 - Requests from Korea, number of Korean members increasing
 - First ASAM members in Canada, Croatia, Israel, Romania, Slovenia, Spain, Ukraine, Turkey, Lithuania,
 - International trademark registrations at several national IP Offices
 (ASAM, ASAM OpenDRIVE, ASAM OpenCRG, ASAM OpenSCENARIO, ASAM OSI)





Some Highlights (Last Twelve Months), ctd.

ASAM Actively Drives Its Evolution – Inside and Outside

- Services for ASAM members worldwide
 - Two-days Technical Seminar 2020, ASAM General Assembly 2021 (all online)
 - ASAM SIM:Guide
 - Webinars, Social Media, ...
- A Recognized Partner in the Standardization Community
 - Several Liaison Agreements with ISO (SC5, WP 9, ...)
 - MoU with SAE, discussions with AVSC and ORAD committees
 - Attendee Agreement with AUTOSAR, regular meetings, common presentation at AUTOSAR Open Conference 2021 (XIL, SOVD, OSI, ...)
 - Eclipse Foundation: discussions on common activities in OpenX
 - Several introductory calls with IEEE
 - Observer seat at IAMTS Executive Committee, collaboration with WG's
 - MoU with CITA (International Motor Vehicle Inspection Committee)
- Associate partner in several government funded projects
- Actually, involved in KIsSME, NFID4MobilTech, GAIA-X, ... other projects will follow





ASAM SIM:Guide

Standardization for Highly Automated Driving



The guide contains

- Introduction to the ASAM domain "Simulation"
- All current standardization activities by ASAM in the domain
- Current standardization activities outside of ASAM
 - -> places the ASAM OpenX standards in the larger context of a global standardization landscape
- Application stories from our members
 - -> how do our members use the ASAM OpenX standards
 - -> how have these standards helped to improve processes
 - -> how are they facilitating customer projects

Order your copy today: www.asam.net/asam-guide-simulation



Internationalization of ASAM Japan, China, North America



Japanese ASAM Members

Currently 52 Members

- OEMS
 HINO HONDA
 The Power of Dreams
 The Power of Dreams
- Tier-1 Suppliers
 ALPSALPINE DENSO
 HITACHI
 Inspire the Next
 Hitachi Automotive Systems
- Tool Vendors / Service Providers



Academics



Status: as of June 15, 2021



ASAM in Japan

In the Driver Seat for International Standard Development Activities

ASAM HMS 1.0.0 (Hex File Management System)

• First ASAM Standard completely developed outside of Europe (project lead: Honda)

ASAM SCDL 1.0.0 (Safety Concept Description Language)

- Proposal Workshop end of January 2020
- Proposal was approved at the TSC meeting in May 2020
- Release planned at TSC meeting in November 2021

Discussions of ASAM MCD-2 MC 1.7.1 extensions

ASAM ODS and ASAM XIL Study Groups

Regular meetings of Motorcycle OEM group

Regional Meeting Japan 2020 in Tokyo (online) with more than 150 participants!



ASAM **OpenDRIVE Concept WP4** (International Traffic Signs)

• Driven by a dedicated workgroup in Japan (project lead: Mitsubishi Precision)



Chinese ASAM Members

Currently 33 Members

• OEMs



• Tier-1 Suppliers



Tool Vendors / Service Providers





C-ASAM

A Common Initiative between Automotive Data of China (Tianjin) Co., Ltd. and ASAM e.V.

Tasks of the C-ASAM Working Group:

- Promote interest in ASAM and its standards within the local automotive industry
- Accompany local companies in the use of ASAM standards
- Hold trainings on ASAM standards
- Drive the acquisition and integration of Chinese ASAM members
- Start local and international development of ASAM standards in China

Achievements:

- C-ASAM Website was launched in November 2020
- First Regional Meeting China in November 2020
- First Advisory Committee Meeting in December 2020
- Chinese translations of ASAM OpenDRIVE, ASAM OpenCRG
 and ASAM OpenSCENARIO available
- As of today, 33 Chinese ASAM members (no. 3 worldwide)



Inaugural Ceremony, Chengdu, Sept. 27, 2019



North American ASAM Members

Currently 33 Members

• OEMs



• Tier-1 Suppliers



Tool Vendors / Service Providers



Academia



Status: as of June 15, 2021



ASAM in North America

High Interest in ASAM OpenX Standardization

Despite the overall Corona situation (no possibility to travel to USA in 2020) Important new members from North America with high interest in ASAM OpenX standard development

ASAM OpenX Workshops in 2019

- February at Carnegie Mellon University, Pittsburgh (organized by ANSYS)
- August organized together with Center of Automotive Research (Ohio State University)
- October parallel to "Automotive Testing Expo"

Regional Meeting North America 2020 online

Collaboration with SAE

- Intensive discussions on expert level
- Presentation at SAE World Congress last April (cancelled)
- Presentation at SAE Webinar (AVSC)
 "Standardization for Automated-Vehicle Testing and Simulation"
- Common AV Taxonomy (discussion with AVSC/ORAD)





Standardization at ASAM Portfolio, Roadmap



ASAM Standards Portfolio

ASAM is currently active in 7 domains





ASAM Development

From the First Idea to the Publication of a Standard



Guiding Principles:

- Member-driven Initiatives and decisions are taken by the member companies.
- Open exchange ASAM requests open exchange among all stakeholders.
- Domain expertise

ASAM has a global network of domain experts to develop standards

• Flexible processes

ASAM has lean yet flexible process structures leading to short development times

• Project support

Experienced Technology Managers support the working groups



Release and Project Roadmap 2020

First ASAM OpenX Standards Released, New Standard Development Methods, Possibly a New Domain





Release and Project Roadmap 2021

First ASAM Opensource Standard Released, Possibly a New Domain





Simulation Domain ASAM OpenX Standards – Status Report



An Overview of ASAM OpenX

Current and Future Standards Portfolio in the Domain Simulation



ASAM OpenDRIVE®

Static Road Network Desription

ASAM OpenCRG®



Static Road Surface Desription

ASAM OpenSCENARIO®



Dynamic Scenario Desription

ASAM OSI®



Interface for Simulation

ASAM OpenLABEL



Standardized Labeling for objects and Scenarios

ASAM OpenODD



Defining the Operational Design Domain for Automated Vehicles

ASAM OpenXOntology



Core Domain Model for the ASAM Simulation Domain





Roadmap ASAM OpenX





ASAM OpenDRIVE

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- File format for the description of road networks.
- V1.6.1 released March 2021
 - Integration of OpenCRG
 - Bug fixes & clarifications
- New project starting in May 2021 [Proposal]
 - Two planned releases:
 - V1.7.0 in July 2021
 - Address known issues in V1.6.1
 - V1.8.0 in November 2022
 - New features based on concepts from the OpenDRIVE Concept Paper





ASAM OpenCRG

File format for the description of road surfaces



- Transfer OpenCRG to ASAM
- Improved documentation
- More examples
- New html viewer style based on OpenStreetMap (Matlab)
- Map projection functionality (Matlab)
- Local Curvature Check implemented (C + Matlab)
- Georeferencing support





ASAM OpenSCENARIO 1.x

File format for the description of dynamic content in driving simulation applications

- V1.1.0 released March 2021
 - Many clarifications in the specification
 - Complete restructure of the documentation
 - Support for logical scenarios (Coverage)
 - More flexible maneuver modelling
 - 100% backward compatible to OpenSCENARIO v1.0.0
- Proposal for V1.2.0 currently in preparation...



Improved runtime model of OpenSCENARIO1.x



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ASAM OpenSCENARIO 2.0

User-friendly, machine readable Domain Specific Language (DSL) for scenario descriptions

- V2.0.0 originally planned to release Summer 2021
 → Likely delayed to November 2021
- Current focus: Sharpening the project scope
 → What needs to go in 2.0 vs. what goes in 2.1?
- Language Reference Manual reaching convergence
- Domain Model working on the details e.g., atomic actions for traffic participants and VRUs

I.Introduction 1.I.Scope 1.2.Goals Language Structure and Syntax 2.Language Structure of OpenSELMARO 2.0 2.2.Syntax of OpenSECMARIO 2.0 2.3.OpenSELMARO 2.0 EBINF Grammar v0.03 4.OpenSELMARO 2.0 Lesial-
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2.4. OpenSCENARIO 2.0 Lexical-
Grammar v0.00
2.5. Working Syntax of OpenSCENARIO 2.0
2.6. WARNING: SYNTAX BELOW WILL CHANGE
2.7. Working Lexical Syntax of OpenSCENARIO 2.0
2.8. Decision Making in the Creation of Syntax of OpenSCENARIO 2.0
3. Types
3.1. Basic Types
3.2. Compound Data Types
3.3. Fields
3.4. Methods
3.5. Inheritance
3.6. Extension
3.7. Event definitions
3.8. Modifiers
3.9. Temporal Operators
4. Expressions
4.1. Atomic Expressions
4.2. Compound Expressions
4.3. Non-Expressions
5. Scenarios
6. Semantics
6.1. Execution Semantics
6.2. The Concept of Built-in items and Atomic Scenarios
6.3. Semantics for the First Layer
6.4. Semantics for the second Layer
6.5. Semantics for the 3rd Layer
6.6. Semantics for the 3rd Layer

ASAM OpenSCENARIO V2.0: Language Reference Manual

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1. Introduction

1.1. Scope

Version: 2.0.0

TODO: Scope of the language and the LRM

1.2. Goals

TODO: Goals of the language (see concept document)

2. Language Structure and Syntax

2.1. Language Structure of OpenSCENARIO 2.0

TODO: Will contain introduction to the overall structure of the language (i.e. what are major components of the language, how do they interplay, simple introductory examples), referencing the content in the later chapters for actual details.

2.2. Syntax of OpenSCENARIO 2.0

In this document we are developing both a "working syntax" and "decided / agreed upon EBNF-Grammer" of OpenSCENARIO 2.0. This is partioned for ease of use. Eventually, their will be (1) EBNF Grammer with the desired features of OpenSCENARIO 2.0.

For more detail on working syntax see below after EBNF-Grammer



OpenSCENARIO 2.0 Implementers Forum

A New Approach to Safeguard the Standard in Parallel to Its Development

- A platform for implementers and tool vendors, running in parallel to the development project
- Goal is to develop a shared understanding of two main aspects:
 - 1. Using the language to describe scenarios
 - 2. Implementing support for the language in tools
- Feedback will regularly be exchanged with the development project
- → Ensures a well understood, already partially supported standard on release



OpenXOntology

- An ontology-based architecture for the domain concepts of on-road driving (road traffic, infrastructure, etc.) and thus a common definition of the domain model for the OpenX standards.
- V1.0.0 planned for July 2021
 → Delayed to end of September 2021
- Minimal Working Product (MWP) shared with OpenX project groups for review
 → How to use the Ontology together with OpenX standards in different workflows









- How to label → Labeling formats for objects of interest and scenario data
- Concept paper released November 2020 [Link]
- Standard development project started Dec. 2020 [Proposal Link]
 → V1.0.0 releasing October 2021





OpenLABEL



Taxonomy



The elements of the taxonomy shall be used as labels within OpenLABEL. The Taxonomy can be found within the OpenXOntology Scenario Tagging





OpenODD

- Standardized format for the definition of Operational Design Domains (ODDs)
- Concept Project started on 9th September 2020 [Proposal link]
 → Concept paper releasing August 2021



OpenODD

Format is currently being developed, likley to be a pythonic or DSL similar approach import roadtype, weather def myODD: for roadtype : suitable is [highway, urban_roads, parking_lots] for weather : suitable is any but 'snowfall'

Metrics

- Based on the ODD attributes
- Metrics support the use of ODD in
 - Evaluation
 - Validation
 - Analytics

Uncertainty / Probability / Risk

```
road.type = "freeway" # source can be e.g. maps
pedProp = "P9" # Probability of Pedestrians, via C2X
```

```
if odd.roadtype == road.type
    and odd.pedestrians.threshold < pedProp :
    scene.odd.status = "OK"
else:</pre>
```

```
scene.odd.status = "NOK"
```



Test Specification Study Group

Mission Statement

- Examine the relevant test techniques and use cases for testing and homologation of the ADAS/AD Domain in automotive in detail.
 - → Identify relevant standards, potential workflows and their variants, and the overall interplay between these parts to form a cohesive whole.
- Output: Documented set of overall use case for testing and homologation, a set of potential workflows implementing these, together with an overview of relevant users, standards and their application.
- Additionally, we will identify gaps in the workflows, leading to the identification of potentially needed additions to existing standards, liaisons between standards, or even the need for completely new standards.
- Recommendations for these standards or additions shall be collected and documented. The goal is to define a valid basis for follow up activities and projects



Test Specification Study Group

Roadmap



Milestone



ASAM OpenX Standards - Trademarks

Trademarks are Registered/Under Registration in Europe, Japan, USA, Korea, China, India and Israel

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的標/ Nark: ASAM	II 国家选择是/International registration surbar:	日本国村市行都宜昌 福村 75丁(3936) Examiner of the JPO Inanura Hideko	Tel:+81-3-3501-2392 Fax:+81-3-3588-8506 日本国独共庁実委官 誕生 彩亮(5597)
国際登録日/Date of international registration: 2019/06/27	11. mmggggwm ² 9/international registration number. 1489697	11. 国際登録番号/International registration number:	Examiner of the JPO Fujii Ayane
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Thank you!

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