

Project Proposal Summary Sheet

| | |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Number | P_2022_03 |
| Domain | Simulation |
| Relevant Standard | ASAM OpenODD |
| Project Name | ASAM OpenODD V1.0.0 |
| Project Type | <input checked="" type="checkbox"/> Major <input type="checkbox"/> Minor <input type="checkbox"/> Revision <input type="checkbox"/> Concept <input type="checkbox"/> Implementation <input type="checkbox"/> Study |
| Start Date | 01.05.2022 |
| End Date | t.b.d |
| ASAM Funds | t.b.d |
| Proposer | Siddartha Khastgir (WMG) |

Table of Contents

| | | |
|------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|
| 1 | Executive Summary | 4 |
| 2 | Overview / Goals | 5 |
| 2.1 | Motivation | 5 |
| 2.2 | Use-Cases | 5 |
| 2.3 | User stories / Requirements | 6 |
| 2.4 | Relations to Other Standards, Projects or Organizations | 7 |
| 2.4.1 | Standard and Standardization activities (ASAM, ISO, AUTOSAR, Other)..... | 7 |
| 2.4.2 | Backward Compatibility to earlier releases | 7 |
| 3 | Technical Content | 8 |
| 4 | Review Steps | 9 |
| 4.1 | Mandatory reviews based according to the project type..... | 9 |
| 4.2 | Additional review types..... | 9 |
| 5 | Deliverables | 10 |
| 6 | Project Plan | 11 |
| 6.1 | Work Packages..... | 11 |
| 6.2 | Time Schedule | 11 |
| 7 | References | 12 |
| Appendix: A. Filling Instructions | | |
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| A.1. | Executive Summary | Fehler! Textmarke nicht definiert. |
| A.2. | Overview | Fehler! Textmarke nicht definiert. |
| A.2.1. | Motivation | Fehler! Textmarke nicht definiert. |
| A.2.2. | Use-Cases | Fehler! Textmarke nicht definiert. |
| A.2.3. | User stories / Requirements | Fehler! Textmarke nicht definiert. |
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| A.2.4.2. | Backward Compatibility to earlier releases ... | Fehler! Textmarke nicht definiert. |
| A.3. | Technical Content | Fehler! Textmarke nicht definiert. |
| A.4. | Review Steps | Fehler! Textmarke nicht definiert. |
| A.4.1. | Mandatory reviews based according to the project type | Fehler! Textmarke nicht definiert. |

A.4.2. Additional review types **Fehler! Textmarke nicht definiert.**

A.5. DeliverablesFehler! Textmarke nicht definiert.

PA.6...... **Project Plan**Fehler! Textmarke nicht definiert.

A.6.1. Work Packages **Fehler! Textmarke nicht definiert.**

A.6.2. Time schedule..... **Fehler! Textmarke nicht definiert.**

A.7. ReferencesFehler! Textmarke nicht definiert.

1 Executive Summary

Safety is fundamental to the development of public trust and acceptance of Connected and Autonomous Vehicles (CAVs) and their on board Automated Driving Systems (ADSs) and to enable deployment of automated driving. Safety of CAVs has two aspects: safe design and safe use of the system. In order to ensure safe use of the system, it is important to convey the knowledge of the true capabilities and limitations of the ADSs to the users to prevent misuse of the systems.

In order to establish the true capabilities and limitations of an Automated Driving Systems (ADSs), we need to first define their Operational Design Domain. An ODD refers to the operating environment (road type, weather conditions, traffic conditions) in which a vehicle can drive safely. For example, for Low-Speed Automated Driving (LSAD) systems such as pods and shuttles, the ODD may include urban areas with predefined routes that include pedestrians and cyclists. On the other hand, for a motorway chauffeur system, an ODD may include a four-lane divided motorway and dry conditions only. The types of scenarios a vehicle may encounter will be a function of its defined ODD, making this fundamental to any safety evaluation and scenario identification.

- A more formal definition of ODD as defined by SAE J3016 (2018) states that "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". -

In order to enable stakeholders to share, compare and re-use ODD definitions, there is a need for standards to provide guidance to the stakeholders on both the attributes to be used for ODD definition and a format for defining the ODD using those attributes. BSI PAS 1883 (UK) provides a taxonomy for ODD. Additionally, ISO 34503 uses the taxonomy to provide a high-level definition format for ODD. While these standardization activities address the important needs of the industry, a gap still exists in the industry for an ODD definition format for simulation.

ASAM OpenODD is a representation of the abstract ODD specification in a more well-defined syntax and semantics which enables machines to interpret and perform the required analysis. Additionally, the ASAM OpenODD specification shall be measurable and verifiable for the attributes it specifies.

2 Overview / Goals

2.1 Motivation

An Operation Design Domain definition (ODD) shall be valid throughout the whole vehicle's lifetime. The definition of an ODD is part of the safety concept of a vehicle. Depending on the current development step different information needs to be derived from such an overall ODD.

ASAM OpenODD focuses on a machine-readable [format](#). The ODD must be represented so it can easily be used within simulation and other machine processed environments. The content of ASAM OpenODD will be derived from any abstract ODD, providing the information in a usable manner. For the purpose of using this ODD description for simulations and post-processing the format must fulfill the following requirements:

- Searchable
- Exchangeable
- Extensible
- Machine readable
- Measurable and verifiable
- Readability is important: Format is readable – but main intent is for computer processing (with structure and grammar). ISO 34503 is intended use for human users (structured natural language).

In the scenario based testing workflow ASAM OpenODD will play a very important role supporting the test description, defining the boundaries of what to test and achieving a good test coverage of the operational design domain and its borders.

2.2 Use-Cases

Note: This chapter is not required for Study Projects!

The standard shall cover the following **B**usiness, **E**nd user and **T**echnical use-cases.

- Define the ODD
-

Table 1 xyz Business use case

| | |
|-------------|--|
| ID | |
| Description | |
| Actors | |

Table 2xyz End user use case

| | |
|-------------|--|
| ID | |
| Description | |
| Actors | |

Table 3xyz Technical use case

| | |
|-------------|--|
| ID | |
| Description | |
| Actors | |

2.3 User stories

Note: This chapter is not required for Study Projects!

This can be a list of user stories, features, requirements, issues.

The standard shall include the following features / requirements.

Development Engineer

Test Engineer

Tool Developer

Scenario editor

Data annotation Engineer

Data Scientist

Safety Engineer

Infrastructure operator (regulator, authorities)

- Disclaimer about the usage of the format

Table 4 Feature / Requirement overview

| Feature / Requirement | Type |
|-----------------------|-----------------|
| | Choose an item. |
| | Choose an item. |

2.4 Requirements

ADD REQUIREMENT: Coordination with other standards, Mention ISO 34503, BSI PAS 1883, ISO 34501, SAE J3259: Conclusion of simulation coordination forum to be added here.

ADD REQUIREMENT: alignment with ASAM OpenX family

ADD the Requirement clusters from the concept paper

2.5 Relations to Other Standards, Projects or Organizations

Note: This chapter is not required for Study Projects!

2.5.1 Standard and Standardization activities (ASAM, ISO, AUTOSAR, Other)

2.5.2 Backward Compatibility to earlier releases

For any project where further compatibility considerations are necessary (beyond the project type), please detail them here.

3 Technical Content

<Text>

Colourful brick image:

What aspects of colour bricks should be in project?

Work packages:

WP1:

4 Review Steps

Note: This chapter is not required for Study Projects!

4.1 Mandatory reviews based according to the project type

Table 5 Mandatory Reviews

| Project Type | Internal review | External Review |
|----------------|-----------------|-----------------|
| Revision | Yes | |
| Minor | Yes | |
| Major | Yes | Yes |
| Concept | Yes | |
| Implementation | Yes | |

4.2 Additional review types

The following additional review types shall be carried out by the project:

Table 6 Review Types

| Check | QA-Measure | Responsible |
|--------------------------|------------------------|-----------------|
| <input type="checkbox"/> | Example implementation | Choose an item. |
| <input type="checkbox"/> | <other QA measure> | Choose an item. |

5 Deliverables

Note: This chapter is not required for Study Projects!

At the end of the project, the project group will hand over the following deliverables to ASAM:

Table 7 Deliverables

| Item No. | Description |
|----------|-------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |

6 Project Plan

6.1 Work Packages

Note: This chapter is necessary only for Study Projects which require a budget!

The project consists of the following work packages:

Table 8 Work packages

| WP- No. | Title / Description |
|------------|------------------------------|
| | • (Intermediate) Deliverable |
| 1 | |
| | • |
| 2 | |
| | • |
| 3 | |
| | • |
| | |

6.2 Time Schedule

Note: This chapter is not required for Study Projects!

The work packages shall be carried out as per the following time schedule:

Table 9 Time schedule

| WP- No. | Title / Description | <Year> | | | | | | | | | | | |
|------------|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 1 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7 References

[1] <Document Title>, <Document Author>

[2]



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Automation and Measuring Systems

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