

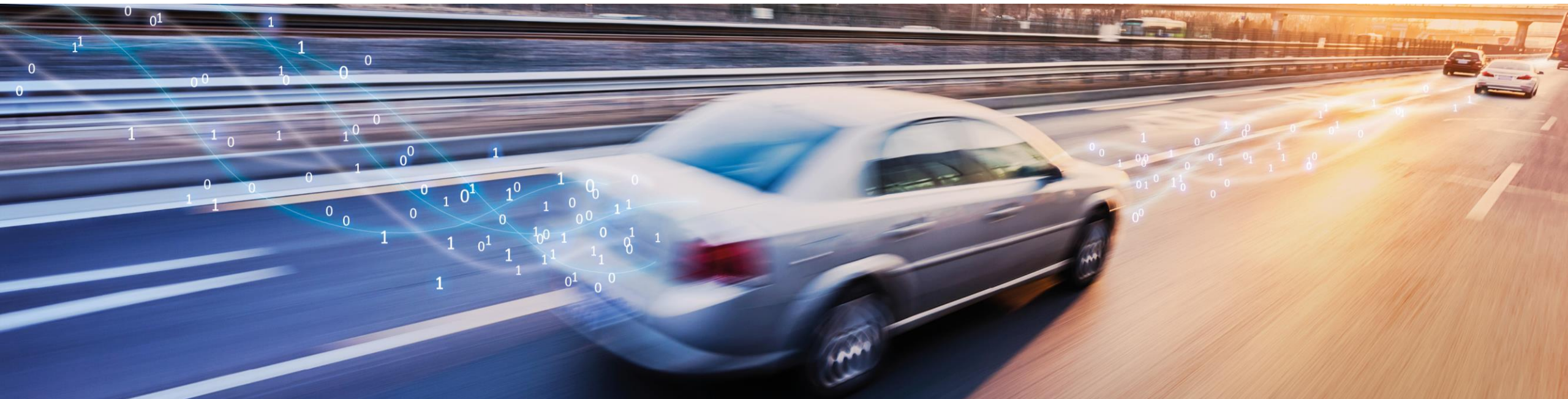
ASAM

2017 / 2018

Dr. Klaus Estenfeld
Managing Director ASAM e.V.

Armin Rupalla
Member of the Board, ASAM e.V.

April 25, 2018
Tokyo



ASAM Compliance Statement

For almost 20 years, ASAM e.V. (Association for Standardization of Automation and Measuring Systems) is actively promoting [standardization within the Automotive Industry](#). Together with its more than 200 members worldwide, the association develops standards that define [interfaces and data models for tools used for the development and testing of electronic control units \(ECUs\)](#) and for the validation of the entire vehicle.

ASAM standards are [recommendations](#), they do not have an impact on regulatory framework.

From the beginning, ASAM has requested and encouraged an open exchange among all [stakeholders: manufacturers, suppliers, tool vendors and research institutes](#). Following this ASAM policy, technical experts from ASAM member companies worldwide commonly [develop new standards in project groups](#). The developed standards are [accessible for all interested companies](#) and serve as basis for the development of tools and ECUs within the respective companies worldwide. Tools and products developed based on ASAM standards allow easy integration into existing value chains and seamless data exchange.

ASAM project groups [do not define products or take any business decisions](#) preventing competition.

Marc Blatter
Chairman of the Board of Directors

Dr. Klaus Estenfeld
Managing Director

<https://www.asam.net/home/about-asam/compliance.html>

ASAM

The Organization

ASAM – At a Glance

Driven by the Needs of the Automotive Industry

Foundation	<ul style="list-style-type: none">1998 as an initiative of the major German car manufacturers: 
Vision	<ul style="list-style-type: none">To create an engineering, simulation, testing and automation environment where devices and software applications can be freely interconnected and data can be seamlessly exchanged.
Purpose	<ul style="list-style-type: none">Platform to develop, enhance and to promote standards for the automotive industryLegal representative of currently 26 standards
Legal Form	<ul style="list-style-type: none">Registered Association under German lawNon-profit
Member Base	<ul style="list-style-type: none">More than 200 membersThereof 20 OEMs

Organizational Structure

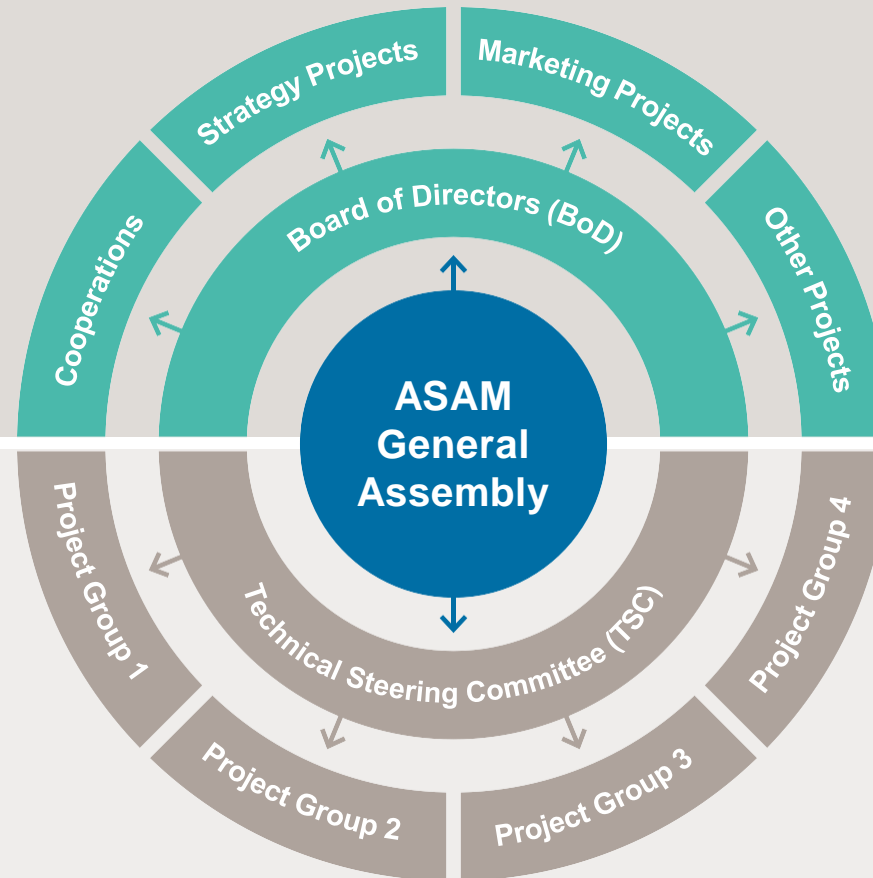
Strategy

The Board of Directors is responsible for the strategic concept of ASAM e.V.

Technology

The TSC is responsible for the technical steering of ASAM e.V.

The standardisation work is organized in project groups.



Board of Directors

Voluntary Representatives from International OEMs, Tier-1s and Tool Vendors

- Marc Blatter (Chairman)
Daimler AG
- Dr. Ralf Nörenberg
HighQSoft GmbH
- Prof. Dr. Marcus Rieker
HORIBA Europe GmbH
- Armin Rupalla
RA Consulting GmbH
- Richard Vreeland
Cummins Inc.



Technical Steering Committee (TSC)

A Highly Experienced International Team of Experts from Automotive Industry – **Next Election at GA 2108**

- **AVL LIST GmbH**
Dr. Gerald Sammer
- **Audi AG**
Franz Wöhl
- **Continental AG**
Helmut Wellenhofer
- **dSPACE GmbH**
Dr. Hans-Joachim Rabe
- **emotive GmbH**
Dr. Jörg Supke
- **ETAS GmbH**
Killian Schnellbacher
- **National Instruments Corp.**
Stefan Romainczyk (Speaker)
- **Peak Solution GmbH**
Dr. Hans-Jörg Kremer
- **Robert Bosch Engineering Ltd.**
Umesh Kini
- **Softing GmbH**
Markus Steffelbauer

<https://www.asam.net/conferences-events/detail/general-assembly-technical-seminar/>

ASAM Membership

More Than 200 Member Companies Develop and Apply ASAM Standards

OEMs



Tier-1 Suppliers



Tool Vendors / Service Providers



Universities / Research Institutes



Global Distribution of OEM and Tier-1 Supplier Members

Japan – The Definite Number 2 behind Europe!



ASAM Internationalization

Status Japan

Japanese ASAM Members

Currently 28 Members – Six more since Regional Meeting Japan 2017

- OEMs



NISSAN MOTOR CORPORATION



- Tier-1 Suppliers



- Tool Vendors



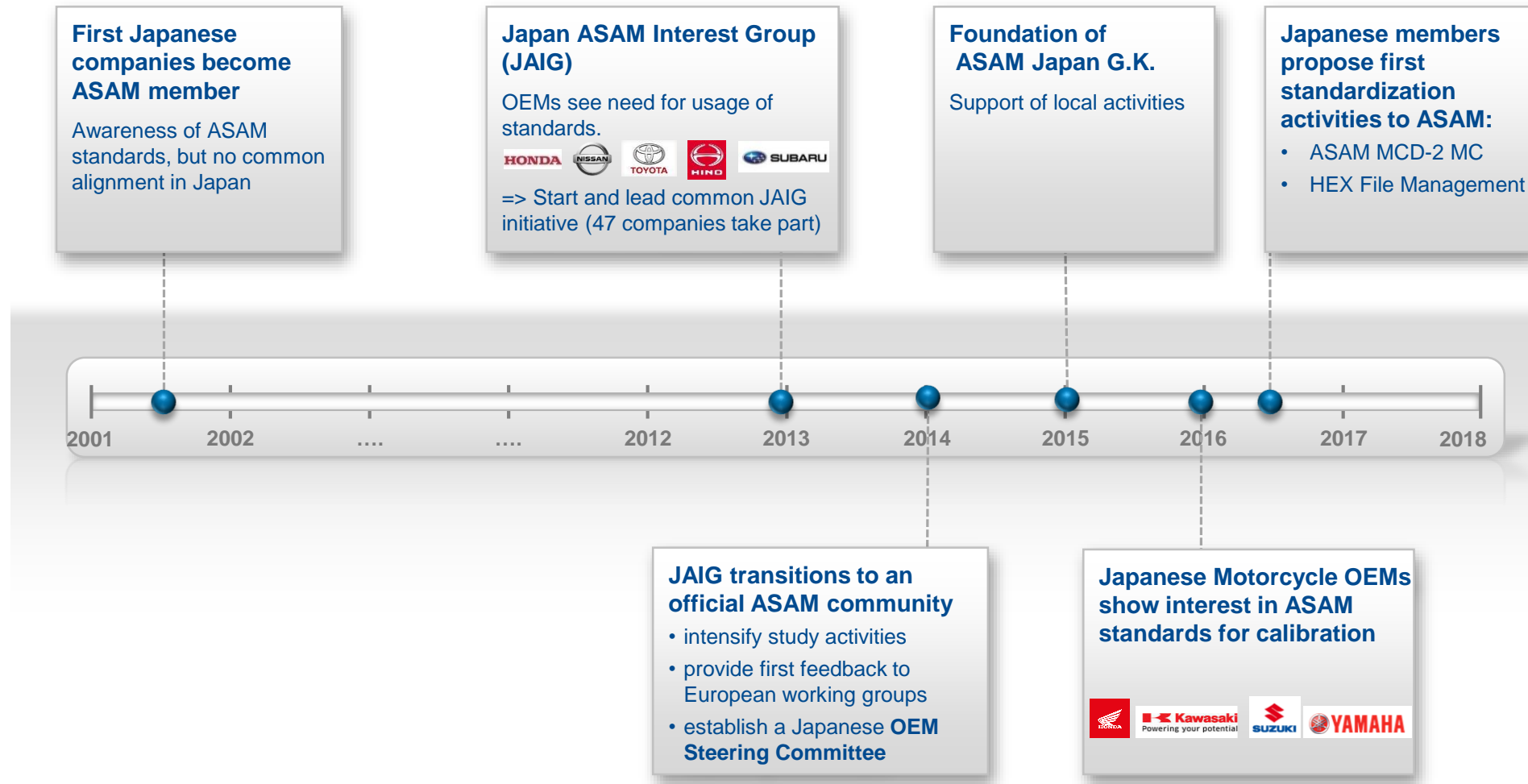
- Academics



Status April 2018

Japan – First Standardization Activities

Japanese Engagement in ASAM Increased Significantly in the Past Years



Japan – Achievements

Internationalization starts Locally

- Japan second after Germany in the number of members
- ASAM Japan G.K. is up and running to support and drive locally
- Mr. Shoi is the official ASAM representative since July 2016
- Active community is set up, increasing number of Study Groups
- ASAM booth (no. 243) at JSAE 2018
- Regular OEM meetings – Automotive as well as Motorcycle OEMs
- Yearly Regional Member Meeting with high interest and engagement
- First standardization activities
 - International Maintenance project ASAM MCD-2 MC 1.7.1 successfully conducted
 - Japanese Concept Project Hex File Management
 - Further Standardization activities in planning

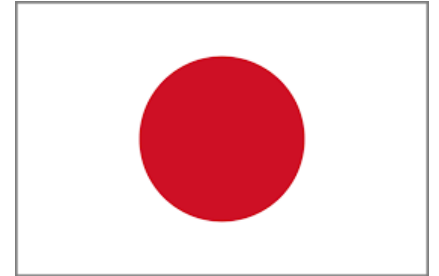


Japan

Highlights – Activities 2017

Standardization Projects have been started and continue to 2018

- ASAM MCD-2 MC V1.7.1 Pilot project:
International collaboration project, project lead with VECTOR, Honda, Nissan and Toyota participate in the project.
- Hex File Management concept project:
Honda, Nissan, Toyota, Hino and Subaru participate in the project.
Consolidated use case diagrams elaborated and submitted to and approved by TSC.



Motorcycle OEMs executing cross tests along with their common requirements

- Cross tests are being done based on their common requirements of ASAM MCD-1/2 MC.
- After the tests are finished, the Motorcycle OEMs will plan the next steps for standardization.

ASAM Regional Meeting Japan in April 2017

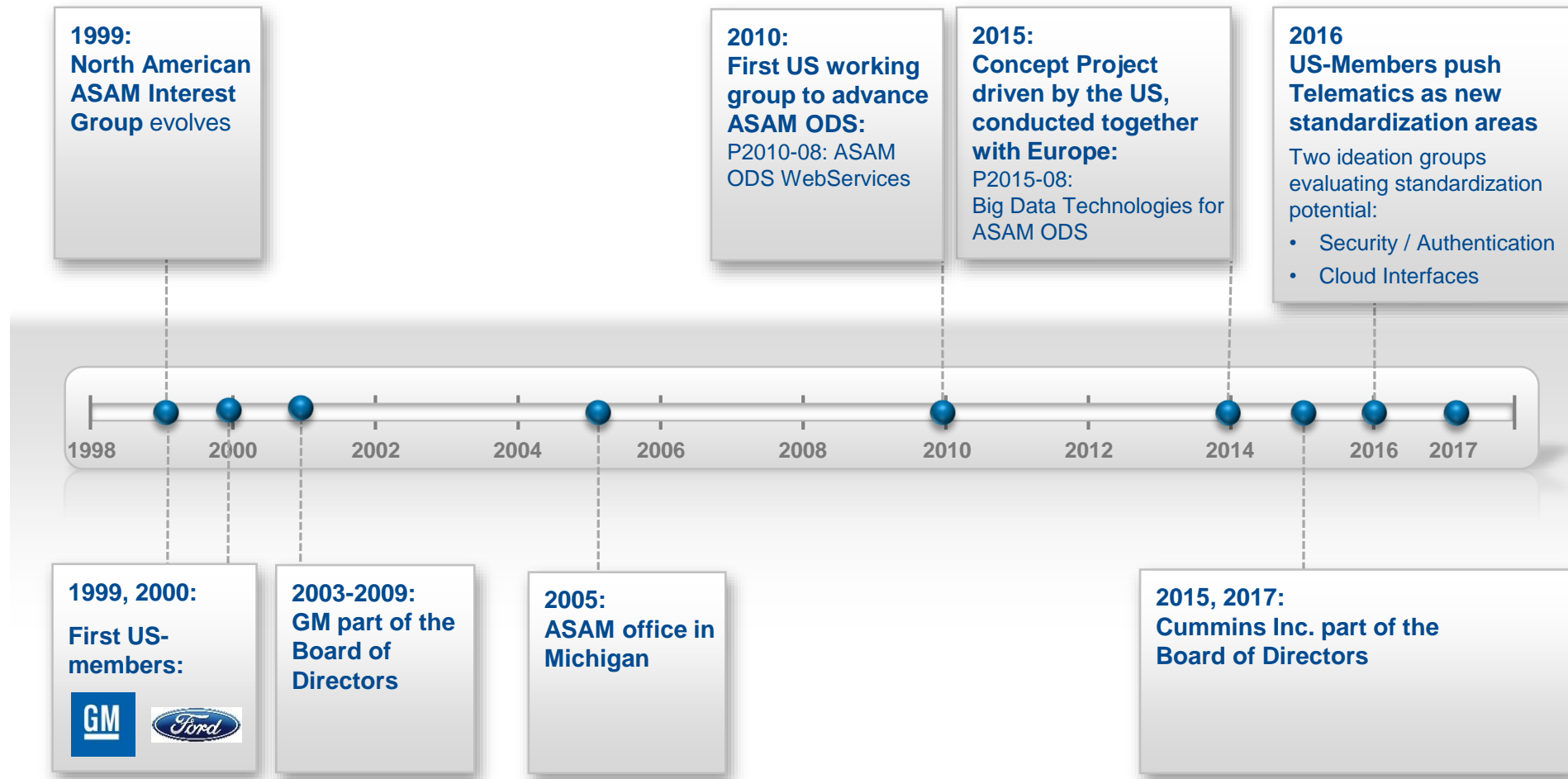
- 60 persons participated from seven OEMs, five Tier-1s and tool vendors.

ASAM Internationalization

Status USA

USA – Targeting New Domains

US Members are Active as BoD Member and in the Standardization Process



North American ASAM Members

Currently 21 Members

- OEMs



- Tier-1 Suppliers



- Tool Vendors / Service Providers



Status April 2018

USA

Revitalize the US Activities – Past and Future

Business Development in the new Domain “Telematics” started in 2016

2 Ideation Workshops in 2016, 2 topics have been selected:

- “Authentication, Authorization”
- “Cloud Interfaces”
- Activities have been stopped in March 2018



Yearly “Regional Meeting North America” during Automotive Testing Expo in Novi MI

- Inform about the ASAM activities worldwide
- Give the US members a place for networking

Collaboration with SAE

- **Target:** Coordinated and Consolidated Development of Standards
- Collaboration to avoid redundancy on standards beneficial for the industry
- Cross-Transfer of standards as an option
- **The geographical strengths of SAE and ASAM are complementary and collaboration between the two organizations could lead to true global standards throughout the industry**

ASAM Standardization

Increased Contribution by International Teams

Current Domains of ASAM Standardization

New Domains to Come in 2018



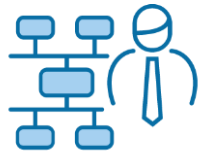
MEASUREMENT & CALIBRATION

- ASAM MCD-1 CCP
- ASAM MCD-1 XCP
- ASAM MCD-1 POD
- ASAM MCD-2 MC (ASAP2)
- ASAM MCD-2 CERP
- ASAM CDF
- ASAM MDF
- ASAM CPX



DIAGNOSTICS

- ASAM MCD-2 D (ODX)
- ASAM MCD-3 D
- ASAM OTX Extensions



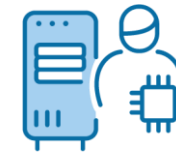
ECU NETWORKS

- ASAM MCD-2 NET (FIBEX)



SOFTWARE DEVELOPMENT

- ASAM MDX
- ASAM FSX
- ASAM LXF
- ASAM ISSUE
- ASAM CC
- ASAM MBFS



TEST AUTOMATION

- ASAM MCD-3 MC (ASAP3)
- ASAM MCD-3 D
- ASAM XIL
- ASAM ACI
- ASAM GDI
- ASAM ATX



DATA MANAGEMENT & ANALYSIS

- ASAM ODS
- ASAM CEA

Standardization Activities in 2017

Some Highlights

- **New Standard: ASAM MCD-1 POD**
 - Standardization of a technically challenging area: the POD software interface.
 - Benefit: End-users have less tool integration efforts and can easily swap PODs from multiple vendors.
- **New Standard: ASAM MCD-1 XCP Debugging Extension**
 - Associated standard for XCP.
 - Benefit: Allows low-cost debugging via XCP. No debug-interface adapter needed.
- **Major Release: ASAM ODS 6.0**
 - Specification of a new web-based API:
 - using modern Internet technologies
 - inexpensive in implementation
 - easy to use
- **First Japan Driven Activities**
 - First joint JP-EUR project to update an existing ASAM standard: ASAM MCD-2 MC v1.7.1.
 - First concept project to prepare development of a new standard: HEX File Management.

Release and Project Roadmap for 2018



Projects Currently in Acquisition:

- ASAM MDX 1.x (Toyota)
 - HEX-File Management (Honda)
 - OpenDRIVE (VIRES)
 - SCDL (SCN-SG/Gaio)
 - Mission Profile Format (Bosch)
- (further details: see next slide)

Planned Releases in 2019/2020

- ASAM ODS 6.1.0
- ASAM ASAP3 3.0.0
- ASAM iLinkRT 2.0.0
- ASAM iLinkRT 3.0.0
- ASAM OTX-Extensions 2.0.2
- ASAM XIL 2.1.2

More Details About Projects in Acquisition

- **Hex-File Management (HMS)**
 - Concept project finished.
 - Includes technical concept for a meta data model and API.
 - TSC: Recommendation to carry out a concept review with European OEMs.
 - Group wants to proceed with developing a standard.
- **Safety Concept Description Language (SCDL)**
 - Public specification for description of safety architecture of safety-critical systems and safety requirements.
 - Is one building block to meet ISO 26262 certification.
 - Created by a Japanese work group consisting of 4 OEMs and 23 other companies.
 - Some skepticism among Japanese OEMs about this standard.
 - Potential transfer to ASAM.
- **Mission Profile Format**
 - Data model (in XML) to store data about environmental loads for automotive components.
Examples of loads: EMC, temperature, vibration, humidity, dust, chemicals, also user-induced loads
 - Needed for the systematic assessment of reliability and robustness of components.
 - Used for the "missions": manufacturing, storage and transportation, environment, application.
 - Is one result of the BMBF-sponsored project "autoSWIFT" (www.edacentrum.de/autoswift).
Project partners: Audi, Bosch, Infineon, FZI, Hood, Globalfoundries, TU Dresden, etc.



Telematics

Ideation Groups:

1. Authentication / Authorization

2. Cloud to Cloud Interface

Focus:

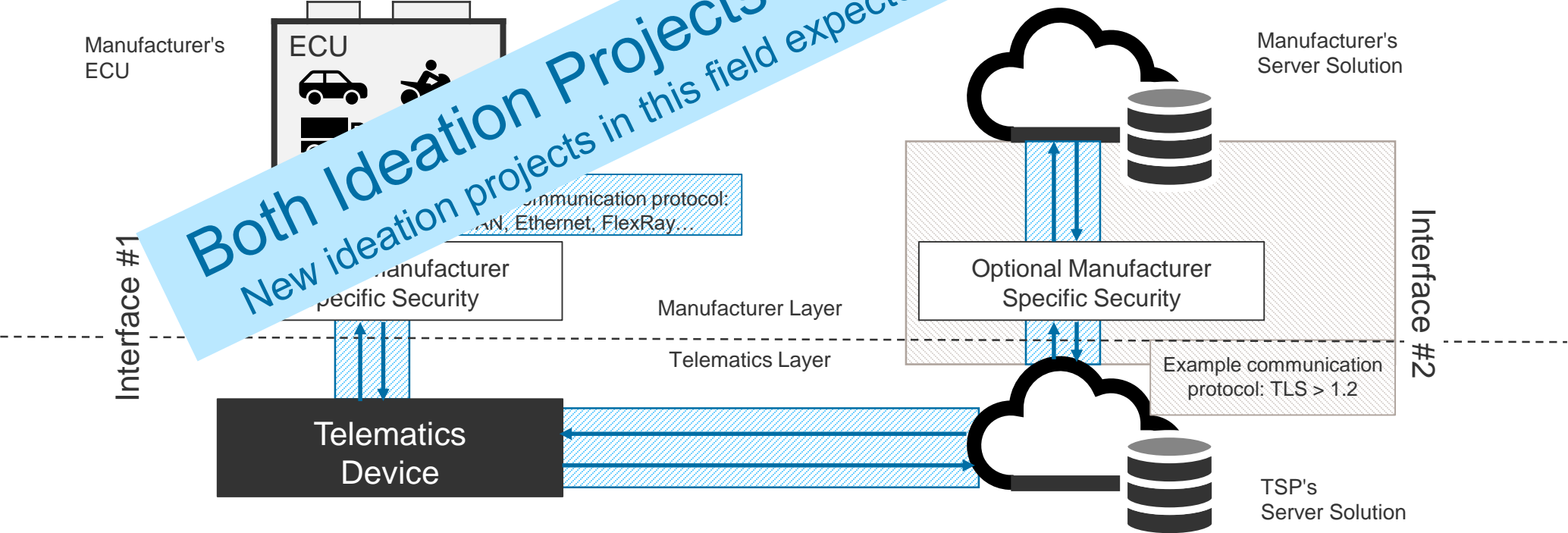
Protocol for Telematics Box to identify ECUs on the network, authenticate the Telematics box, and to authorize its access to specific ECU data
(Includes definition of security methods and protocols)

Protocol for the exchange of read/write data between the TSP's and the manufacturer

Next Step:

Proposal Workshop
(Date / Location: TBD)

Proposal Workshop
(Date / Location: TBD)



ISO Liaison

Formal Liaison Accepted by ISO



Reasons for Liaison with ISO

- Multiple standards shared between ASAM and ISO (e.g. ODX, GDI and MCD-3 D).
- Some ASAM standards are based upon ISO standards (e.g. OTX-Extensions, CERP, CPX).
- Many ASAM standards are related to other ISO standards (e.g. XCP, FIBEX, ODX).

→ ASAM must know, if relevant standards are going to be changed, i.e. know NWIP*).

→ ASAM may provide comments on NWIPs and/or informs affected members.

Request to ISO

- Request for category A liaison in [ISO/TC 22/SC 31 "Data communication for vehicle applications"](#).
- Got approved on Sep. 11, 2017.

Rights and Responsibilities

- Have access to ISO general documents such as guidelines and templates.
- Have access to the ISO/TC 22/SC 31 file repository.
- Others: tbd.

Topics under ISO/TC 22/SC 31:

- Data buses and protocols (including dedicated sensor communication)
- V2X communication (including V2G)
- Diagnostics
- Test protocols
- Interfaces and gateways (including those for nomadic devices)
- Data formats
- Standardized data content

*) NWIP: New Work Item Proposal

A New ASAM Domain for Highly Automated Driving

Open* Standards

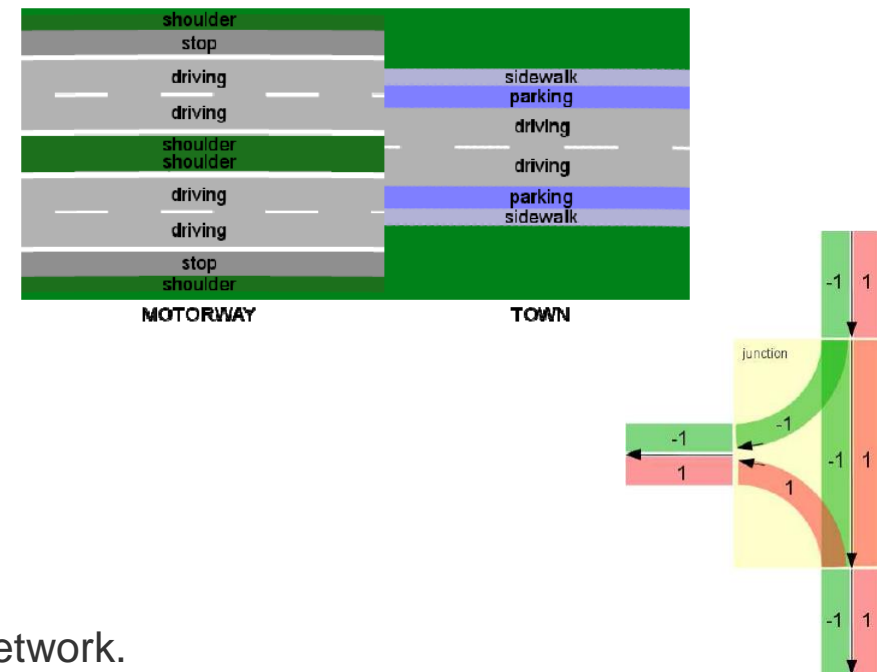
Automated Driving – Driving Simulators for Testing in Virtual Environments

- The standards/projects **OpenDRIVE**, **OpenSCENARIO**, **OpenCRG** and **Open Simulation Interface** fit into ASAM's technical scope of standards.
- ASAM **welcomes the idea to transfer** the projects to ASAM and drives the discussions with the current owners.
- After their transfer, these standards will constitute a **new technical domain (“Simulation”)** within ASAM.
- **A first result:** ASAM is **about to sign the contract** with the current owner of OpenDRIVE (VIRE Simulationstechnologie GmbH).
- As soon as the OpenDRIVE contract is signed, the **transfer of the other standards** will be tackled.

OpenDRIVE

Standardizing the Logical Road Description for Data Exchange between Different Simulators

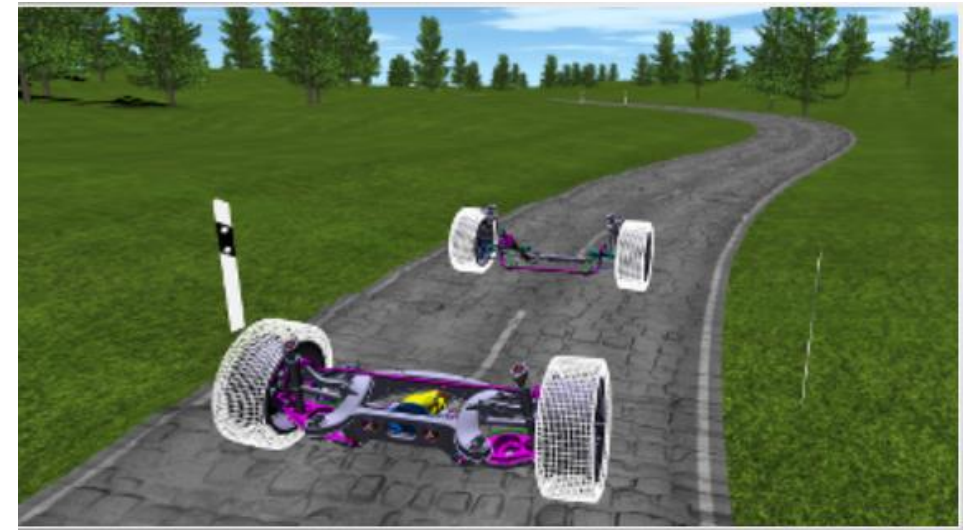
- File format for the **description of road networks** (macroscopic view).
- Initiative started in 2005 by Daimler and VIRES
- Used for simulators in the area of
 - Vehicle dynamics
 - Traffic simulation (incl. autonomous driving)
 - Sensor simulation
- Description elements (not complete):
 - Straight lanes
 - Curves, clothoids
 - Junctions
 - Elevation profiles
 - Traffic signs and signals
 - Road-side objects
- Not included: entities acting on or interacting with the road network.
- Data may be derived from road scans, map providers, road network design software or other sources.
- Based upon XML and a hierarchical data model.



OpenCRG

Real Road Surfaces become Available to “Classic” Simulation Applications

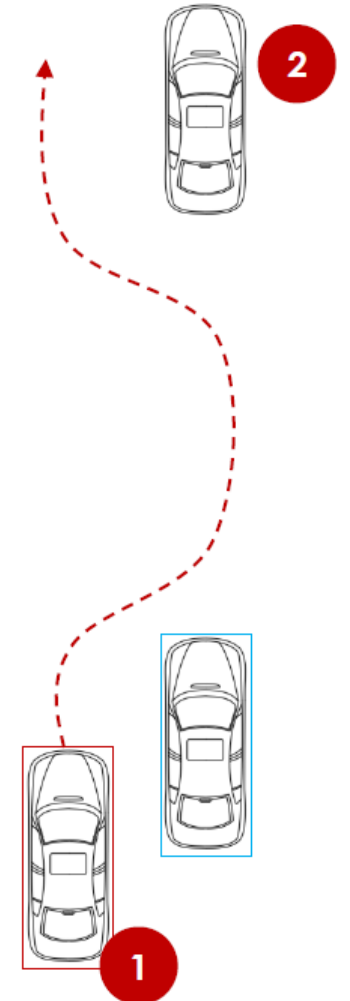
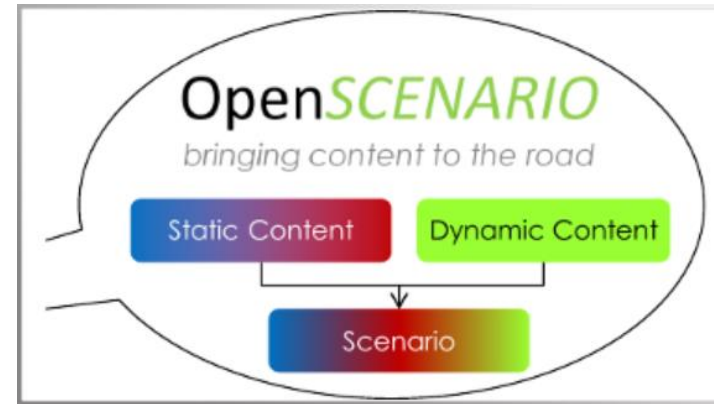
- CRG: “Curved Regular Grid”
- Open file formats and tools for the **detailed description of road surfaces** (microscopic view)
- OpenCRG initiative was started in 2008 by Daimler together with AUDI, BMW, Porsche, and Volkswagen
- The file format of OpenCRG is integrated in OpenDRIVE.
- Used for the description of patches of road surfaces in a very detailed manner, so that it can be used for
 - Tire simulation
 - Vibration simulation
 - Driving simulation, etc.
- Source-code included:
 - C API for data handling and evaluation
 - MATLAB API for data manipulation and generation
 - Library of sample data



OpenSCENARIO

Bringing Content to the Road

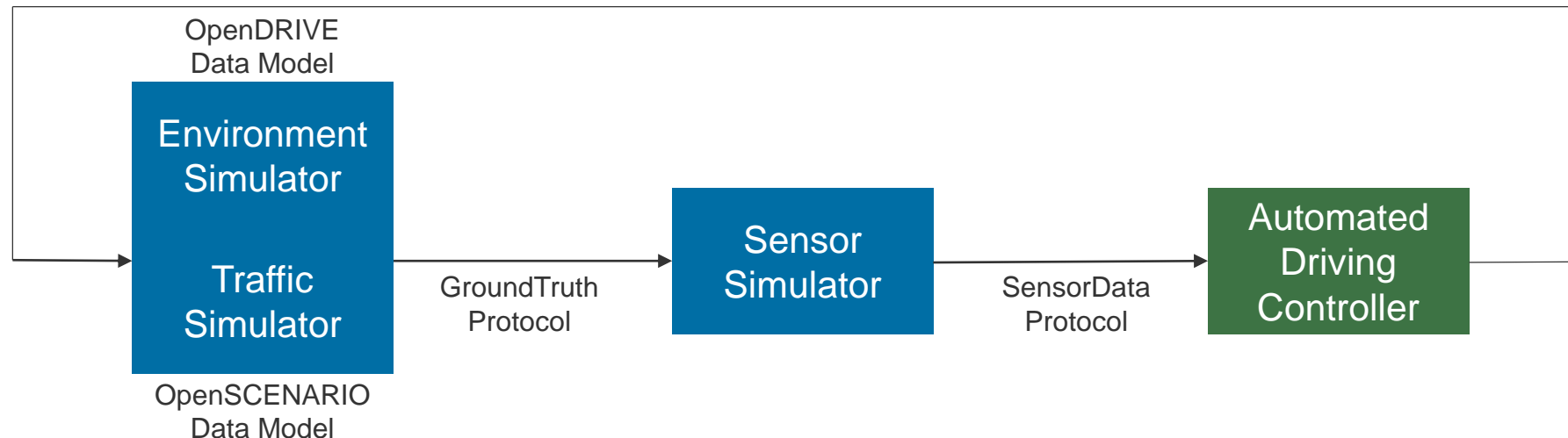
- File format for the **description of dynamic content in driving simulation applications**.
 - Project in an early stage (started in 2014)
 - Used for simulators
-
- Description elements:
 - **Driving maneuvers** (of multiple cars)
 - **Vehicle model** (geometry, weight, engine and brake performance, etc.)
 - **Driver model** (interaction with traffic and infrastructure, longitudinal and lateral control, vehicle control, etc.)
 - Based upon XML



Open Simulation Interface (OSI)

Enable Compatibility between Automated Driving Functions and the Variety of Driving Simulation Frameworks

- A generic interface for the environment perception of automated driving functions in virtual scenarios
- Initiated by BMW and Technical University Munich (TUM)
- Contains an object-based environment description using message formats based on Google Protocol Buffers for two types of data:
 - "GroundTruth": gives an exact view on the simulated objects in a global coordinate system.
 - "SensorData": describes the objects in the reference frame of a sensor for environmental perception.



- In preparation: code of a run-time environment based on the Open Simulation Interface, including the conversions between GroundTruth and SensorData messages.

Ideation for Telematics, Highly Automated Driving ...

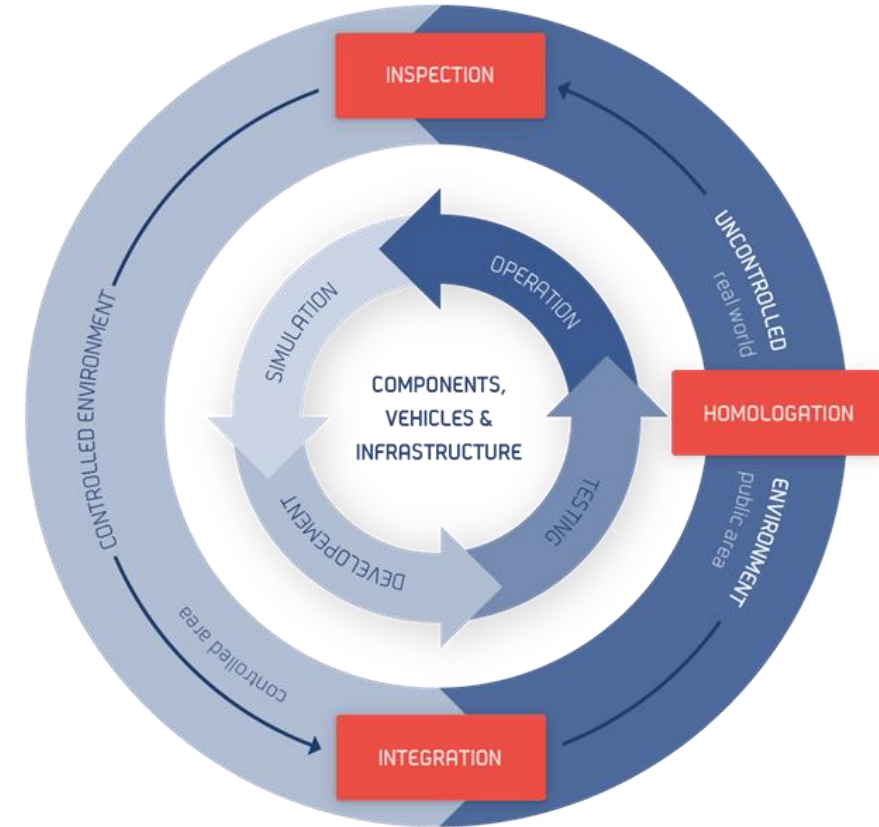
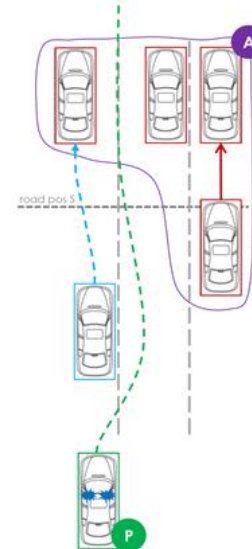
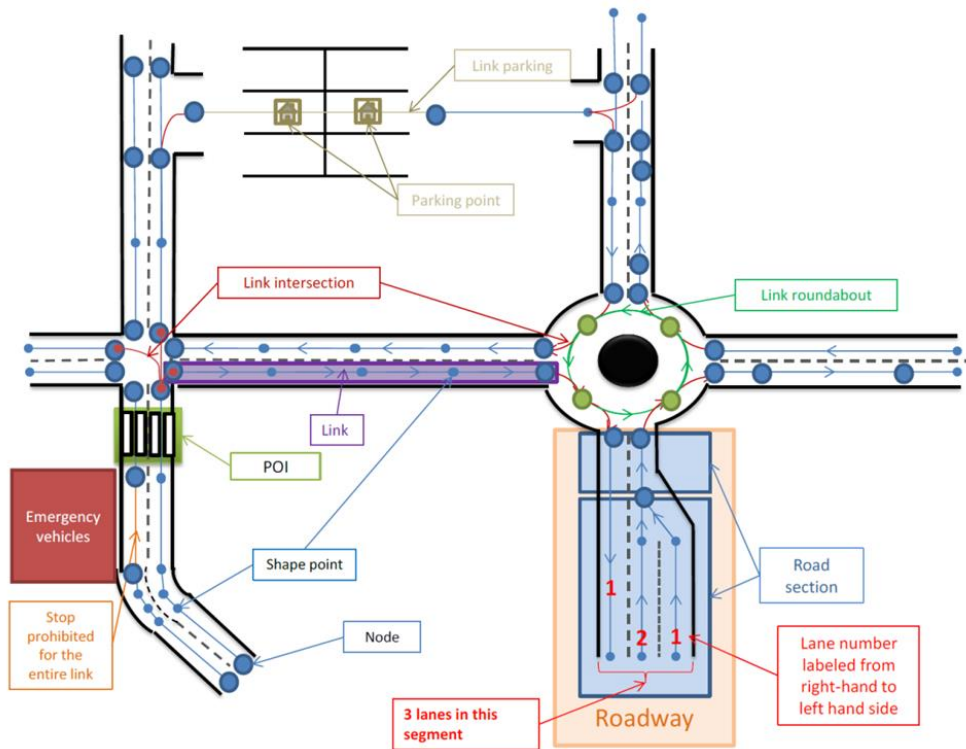
Armin Rupalla

ADAS development and function certification

Cost reduction by interoperability and compatibility

10 million maneuvers and 150 millionen miles driven for certification

> 150.000.000
DRIVEN OR SIMULATED MILES

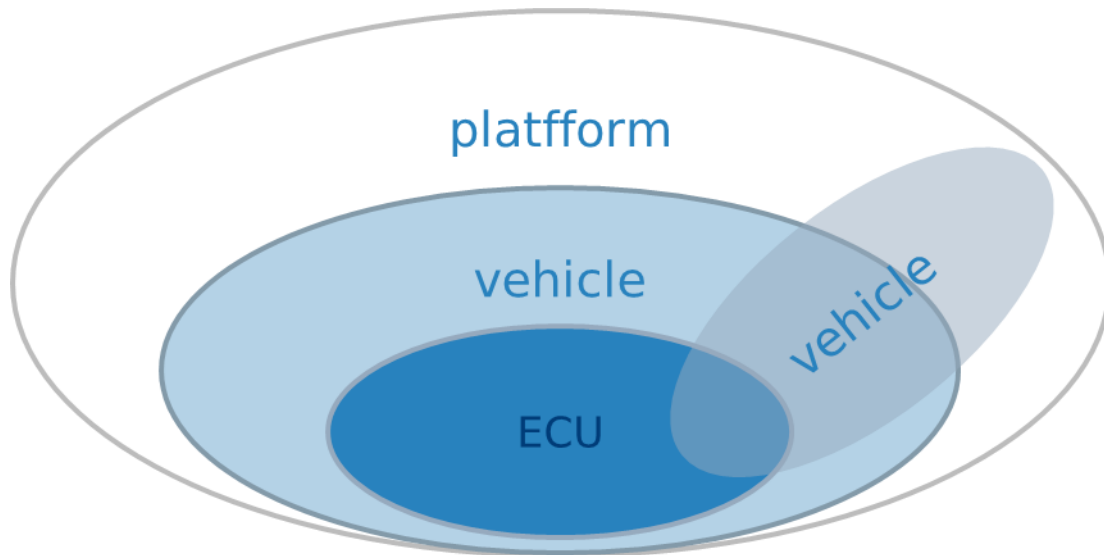


ODX methodology

Consequences

ODX Runtime clears the ODX file and reduces data volume for a specific vehicle or ECU:

- Remote diagnostics access specific vehicles or ECUs because of authorization and authentication processes identify the vehicle and the build in components
- The embedded systems require the smallest footprint possible for the embedded tester



Data format	Files	Volume
Platform-PDX (all vehicle variants)	>500	> 1000 MB
Specific Vehicle (runtime format)		0,5-5 MB

ODX containers carry unused data which have no relevance for the specific vehicle or ECU:

- Due to enrichment and disinheritance
- Because of providing general calculation informations and tables in ECU-SHARED-DATA

ASAM ODX Runtime format proposal

Advantages

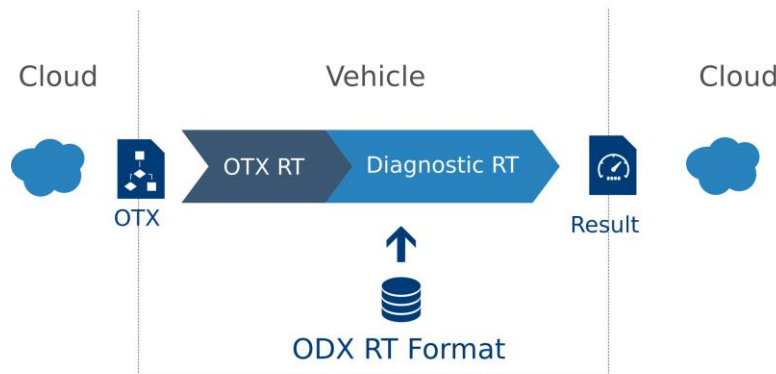
ODX Runtime clears the ODX file and reduces data volume for a specific vehicle or ECU:

- Remote diagnostics access specific vehicles or ECUs because of authorization and authentication processes
- ODX runtime should be transformed automatically out of the original ODX file

Data format	Files	Volume
Platform-PDX (all vehicle variants)	>500	> 1000 MB
Specific Vehicle (runtime format)		0,5-5 MB

Telematic Scenario

ODX, OTX and MVCI on Limited Resources



ODX Runtime Format at a Glance....



Exchangable

- Current situation: Every MVCI vendor has its own runtime format.
- The OTX runtime format will guarantee a standardized format and a comparable performance
- No new ODX standard: ODX runtime format is generated out of ASAM ODX



Small & Reducable

- Current situation: Even non embedded ODX processing exceeds modern memory resources
- Aspects not needed for runtime can be skipped (e.g.SDGs, inheritance etc.)
- ODX can be reduced due to use-case specific requirements (e.g. if one service for one ecu is needed)



Well Structured

- Current situation: ODX is stored in a hierarchical linked XML structure.
- The runtime structure is better represented by a linked graph.
- ODX Links, name referenced are resolved by precalculating edges between graph nodes



Binary Format

- Current situation: The linked XML based format does not perform well on reading.
- The ODX runtime format should be a read optimized binary format with a small IO and memory footprint.
- Small sized, IO optimized format fits well into embedded and mobile scenarios

ASAM MCD-3MC runtime format proposal

Use-Case, Technical Aspects and Benefits

4.000 GByte data recording per day

„Computer Center are using already 20% out of Frankfurt total energy consumption.“

(Lothar Herbst, Chairman Mainova, dpa 19.07.2017)

Energy consumption of German computer centers in 2014 amount 10 billion kWh and in 2020 the consumption will amount 12 billion kWh.

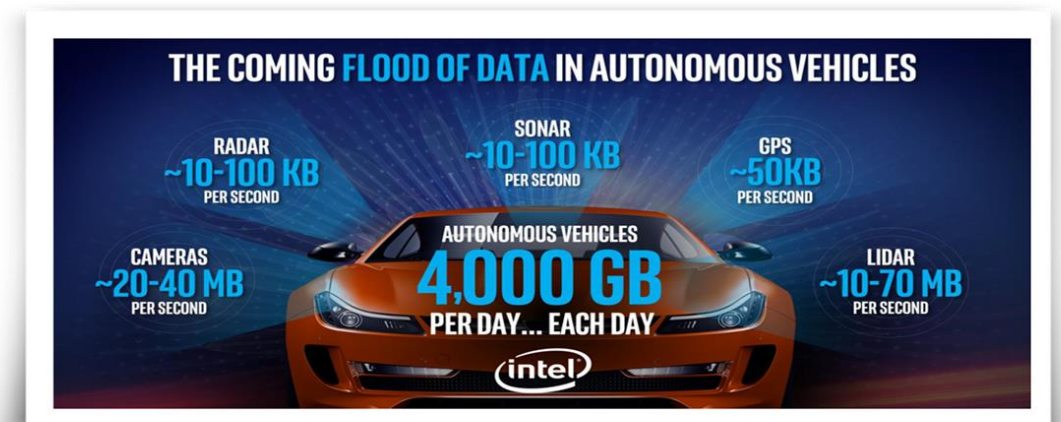
(Ralph Hintenmann, Borderstep Institut, 26.01.2015)

The global energy consumption of computer centers will be trippled in the next 10 years.

In 2015 global energy consumption of computer centers amount 416,2 Terrawatt hours, even more than the energy consumption of UK in 2015 .

Until 2020 only 8% out of all computer centers will use renewable energy ressources.

(ciena.de, 25.08.2016)



ASAM MCD-3MC runtime format proposal

Use-Case, Technical Aspects and Benefits

Use-Case:

- Telematics Testing, Measurement and Calibration application On-Board need small footprints on any embedded platforms.
- To get secure and reliable processes test specification should be deployed on any (standard) platform.
- **New sensors shift the demands from remote diagnostics to remote measurement and calibration**

Technical Environment:

- OTX Testing and Calibration Expert Rules and Programming (CERP) is not available for telematics applications on embedded systems like data logger.
- To access the on a MC kernel is specified over MCD3-MC API. Any object hierarchy accessed by Java or COM does not have the performance for future embedded requirements (measuring grid $<1\mu\text{s}$).
- **To provide functions like configuration (A2L and Hex-file based), triggering, recording, selection and calibration on embedded systems (i.e. Linux) requires an embedded MC kernel.**

Benefits:

- Secure and reliable test processes.
- Efficiency increase by using one time written test sequences multiple on any device.
- **Reducing data volumes at real driving validation because of On-Board preprocessing (selection of events and data)**

OTX openX extensions

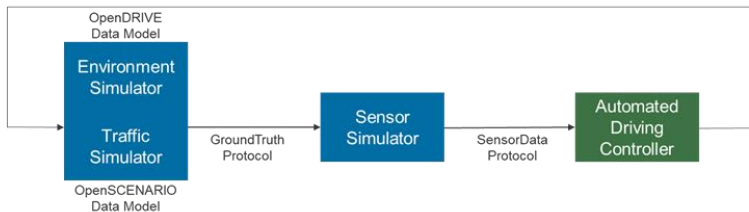
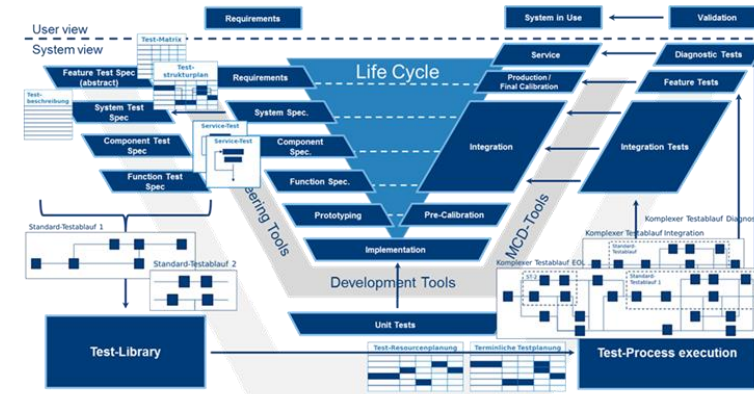
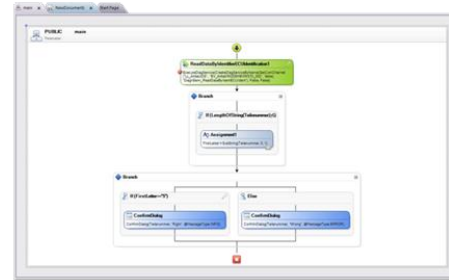
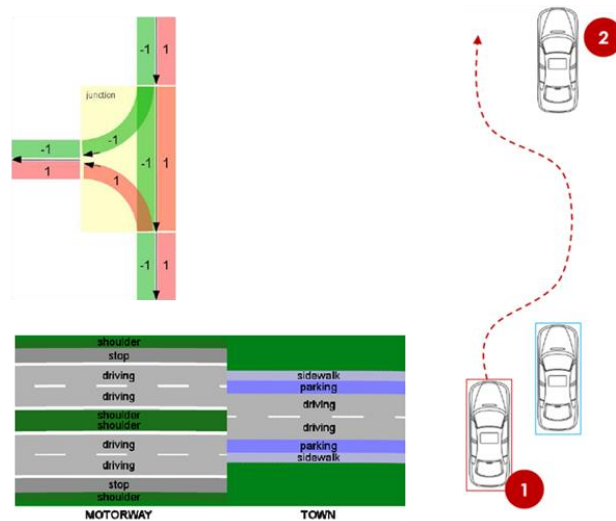
Use-Case

Open-Drive/-Scenario/-SimulationInterface

OTX-Authoring

OTX-runtime

Test Library



OTX based ADAS testing over the life cycle:

- OTX based portable description of ADAS-test sequences
- Certified „open“ test library accessible for all ADAS shareholders

ASAM OTX simulation extensions proposal

Use-Case, Technical Aspects and Benefits

Use-Case:

OTX based description of ADAS-specific test sequences

- reusable in the total life cycle of the vehicle
- deployable on different platforms
- automated selective recording of real driving data

Technical Environment:

- binding/interfacing of environment data (i.e. OpenDRIVE)
- binding/interfacing of single manoeuvres and consistent/persistent combinations of manoeuvres (z.B. OpenSCENARIO)
- Integration of other „Automotive Electronics“ standards in multi platform loadable ADAS function tests

Benefits:

- Secure and reliable test processes.
- Efficiency increase by using one time written test sequences multiple at any phase.
- Cost reductions by reusing test sequences over the whole life-cycle of ADAS testing by any shareholder.
- Setup of a public library of certified ADAS test sequences.

OTX Open Function Controller (OFC)

Use-Case

State of science and technology (Germany/France):

- **Development and homologation of ADAS functions in software, components and vehicles**

„Given the sheer environmental complexity precluding a sufficient level of field testing as a basis for deployment, **we strongly recommend to implement a system of continuous supervision and learning from field observations.....**

To achieve the key objectives, we propose the following measures to be implemented in parallel to R&D activities by industry and public authorities. These focus on technical standards and regulations.“

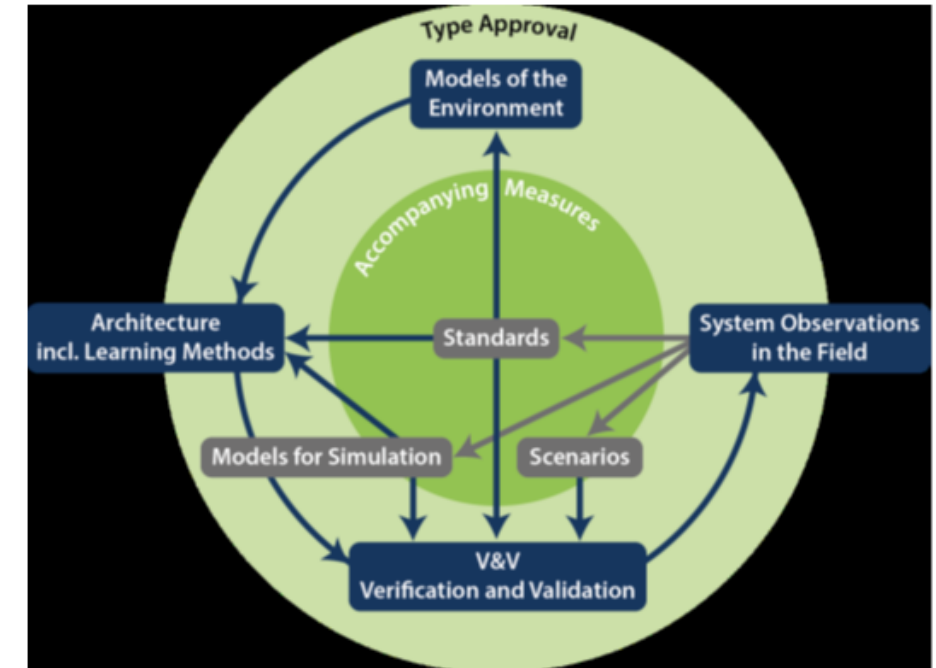


Figure: Key elements of a system of continuous supervision and learning from field observations for highly automated systems

Source: SafeTRANS Working Group "Highly automated Systems: Test, Safety, and Development Processes" Recommendations on Actions and Research Challenges, 08/2017

ASAM Open Function Controller (OFC) proposal

Use-Case, Technical Aspects and Benefits

Use-Case:

Open Function Controller (OFC) standardizations extends OTX ISO 13209 with a formal notation for the descriptions of test functions.

These metadata support a semantic search on test libraries and the classification for test sequences. Both features are needed/used in professional test library administration.

Technical Environment:

The data model should consist out of

- hierarchical classification of functions (Project, Package, TestSuite, TestCase, Action, TestStep)
- detailed description of administrative testing data (Version, AdminData, CompanyData etc.)
- role based authoring process (i.e. specification and realization phase)
- records of meta data
- representation of the library concept in testing
- Representation of pre and post conditions and expected values
- Variables handling between test steps

Benefits:

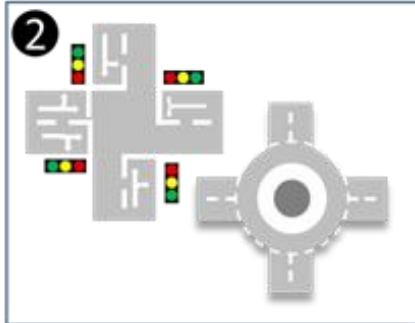
- Secure and reliable test processes.
- Efficiency increase by using one time written test sequences multiple at any phase
- Cost reductions by reusing test sequences over the whole life-cycle of testing by any shareholder.

ASAM ADAS R&D applications

ASAM as an associated research partner



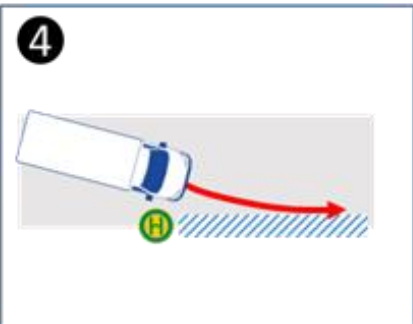
Setup and operation of different test fields in urban environment (Karlsruhe, Lyon)



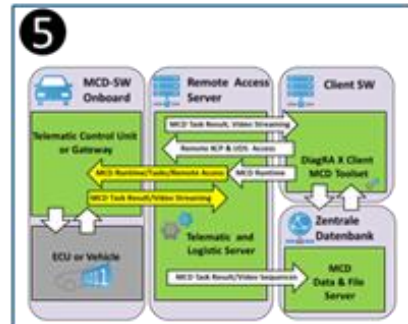
Assembly of different situation specific traffic segments inside the test fields



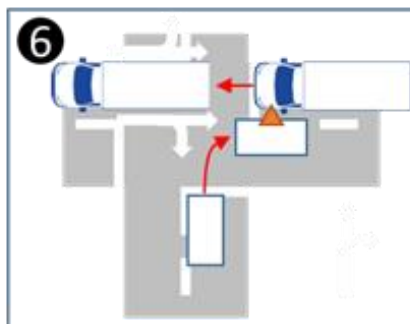
Conceptualization and prototypical implementation of process secure and efficient methods of testing



Autonomous test drive in different complex traffic and driving scenarios



Central recording of driving data out of testing and driving



Analytics of different complex real data of traffic and driving scenarios

Selection/reduction of ADAS data recording (6) (only unsecure driving status/situation/scenario):

- Distance to next obstacle or vehicle smaller than braking distance
- Taking over, crossing passing, right of way,...
- Intervention of the steward
- Close to an accident (stop close to obstacle or passing distance very close)

ASAM Ideation Process

Evaluation of market relevance

Most important!

Please mail to Mr. Armin Rupalla one sentence if you interested in any of our new ideas!

armin.rupalla@asam.net

“We (any OEM or 1-tier) see in the standardization proposal X an interesting technical proposal. This standardization covers for our engineering tasks relevant use-cases. Establishing such a standard could increase the efficiency of our engineering process. We would recommend ASAM to set up a proposal workshop for initiating the standardization in subject area X.”

Services for ASAM Members Worldwide

Online Information, Documents, Conferences, ...

ASAM Website www.asam.net

Comprehensive Information about ASAM – Accessible for Everybody

ASAM Association for Standardization of Automation and Measuring Systems

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About ASAM Standards Ideation Active Projects Conferences & Events Application Stories Members

ASAM International Conference: Autonomous Driving

"Autonomous Driving - Big Testing and Big Data as the Next Challenge"

Meet us at the ASAM International Conference on Dec. 06/07, 2017 in Dresden, Germany to discuss chances and requirements of autonomous driving and their challenges in development and testing.

[LEARN MORE](#)

We do Standards

ASAM is a standardization organization where experts from OEMs, Tier-1s, tool vendors, engineering service providers, and research institutes meet to commonly standardize connections between devices and software applications for a seamless data exchange.

[LEARN MORE](#)

Current Activities

See the standardization projects that are currently being carried out under the roof of ASAM. The latest projects are:

- ASAM ODS
- ASAM OTX Extensions
- HEX File Management

ASAM Standards

- MEASUREMENT & CALIBRATION
- DIAGNOSTICS
- ECU NETWORKS
- SOFTWARE DEVELOPMENT
- TEST AUTOMATION
- DATA MANAGEMENT & ANALYSIS

MEASUREMENT & CALIBRATION

Standards for working with ECU variables and parameters. This includes read-write access to the data in ECU memory, meta-description of the data, storing the data in files and describing the calibration process.

STANDARDS IN THIS CATEGORY

CDF CFX MCD-1 CCP MCD-1 POD MCD-1 XCP MCD-2 CERP MCD-2 MC MDF

LATEST NEWS & PRESS RELEASES

- JUL 28 2017** **ORGANIZATIONAL NEWS**
ASAM Compliance Statement
- JUL 25 2017** **ORGANIZATIONAL NEWS**
ASAM Creates Hub to Capture New Ideas
- DEC 19 2016** **ORGANIZATIONAL NEWS**
ASAM 2016: Looking Back on a Successful Year

[MORE NEWS](#)

MEETINGS & EVENTS

- OCT 26 2017** **ASAM Regional Meeting North...**
Diamond Banquet and Conference Center
- DEC 06 - 07 2017** **ASAM TECHNICAL SEMINAR**
ASAM International Conference
International Congress Center, Dresden

[More Events](#)

PAST EVENTS

General Assemblies, Technical Seminar...
The proceedings are available under the link below.

[PAST EVENTS](#)

ASAM Solutions Guide

A comprehensive guide to ASAM standards, members, ASAM compliant products and application stories.

[DOWNLOAD](#)

Application Stories

Read about the best practice examples from our membership and learn how they benefit of ASAM standards.

[APPLICATION STORIES](#)

Table of Content

- About ASAM
- ASAM Standard Portfolio
- Application Stories
- List of Members & ASAM Related Products
- Member Reference by Standard
- Contact & Imprint

ASAM International Conference 2017

Dresden, December 6 - 7, 2017

“Autonomous Driving – Big Testing and Big Data as the Next Challenge”

In Cooperation with the Saxon State Ministry of Economic Affairs, Labor and Transport

- High interest - More than 220 participants!
- 31 presentations – Local and international
- One presentation from Japan (Hitachi Automotive)
- 27 exhibitors



ASAM Office

“At Your Disposal” – At any Time

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Thank you!

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