

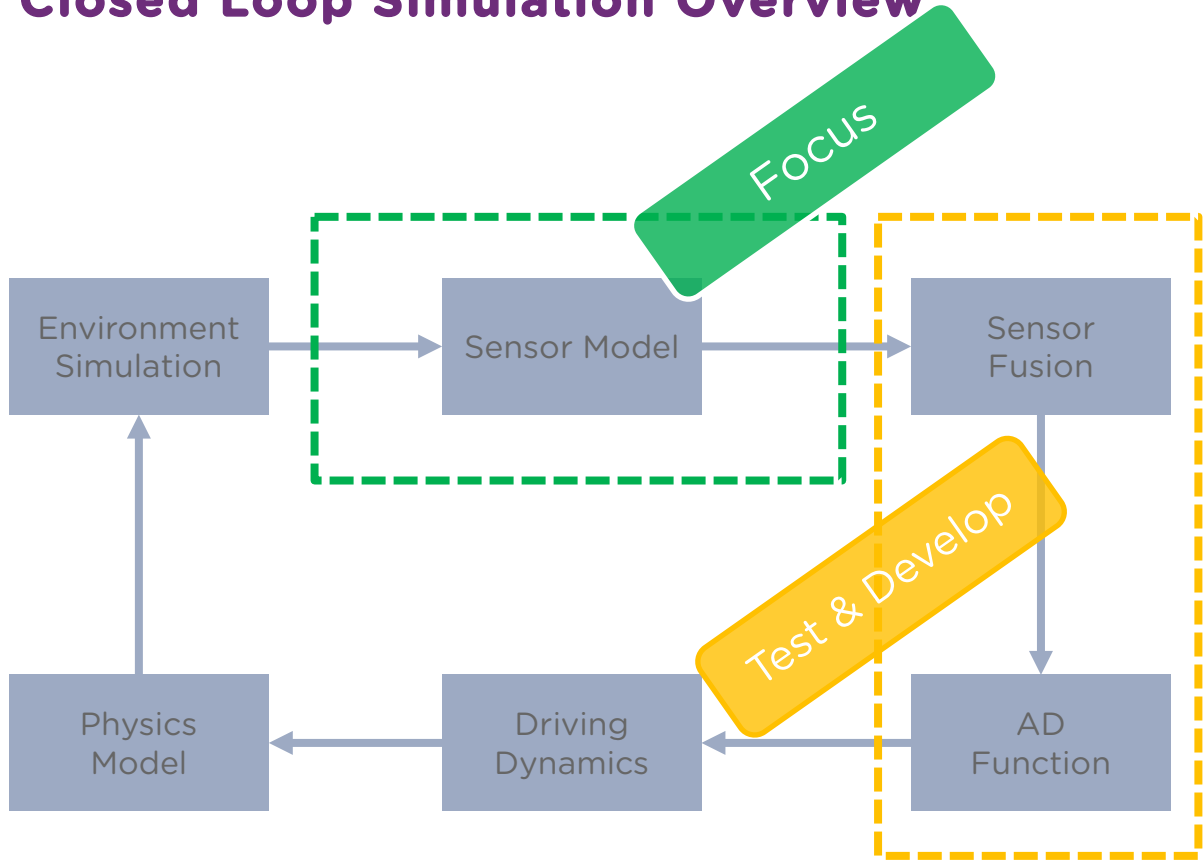


Harmonization Issues for AD Standards Content and Syntax

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Kick-off Workshop ASAM OpenDRIVE and ASAM OpenCRG
2018-10-09 Höhenkirchen

Closed Loop Simulation Overview



Vehicle tests



Vehicle in the loop



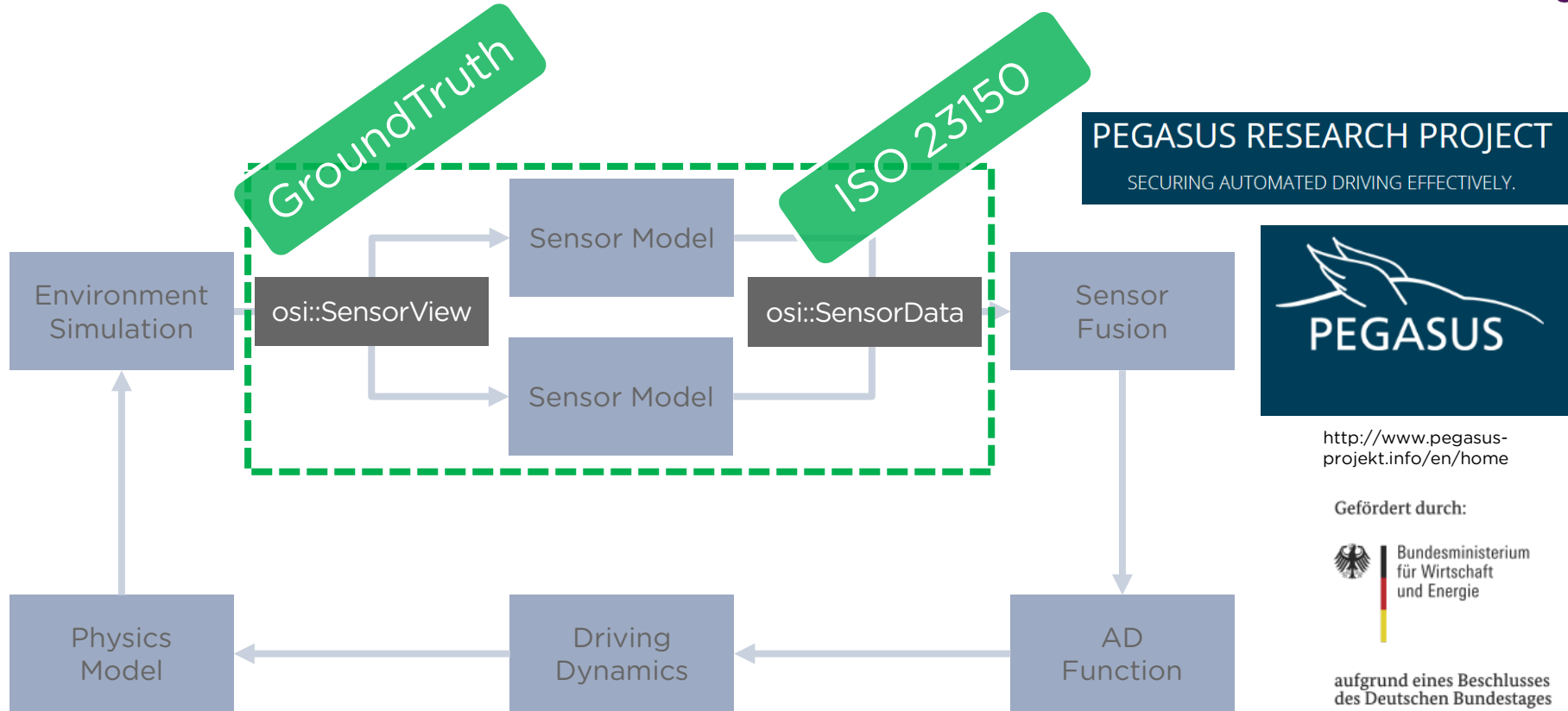
Software in the loop



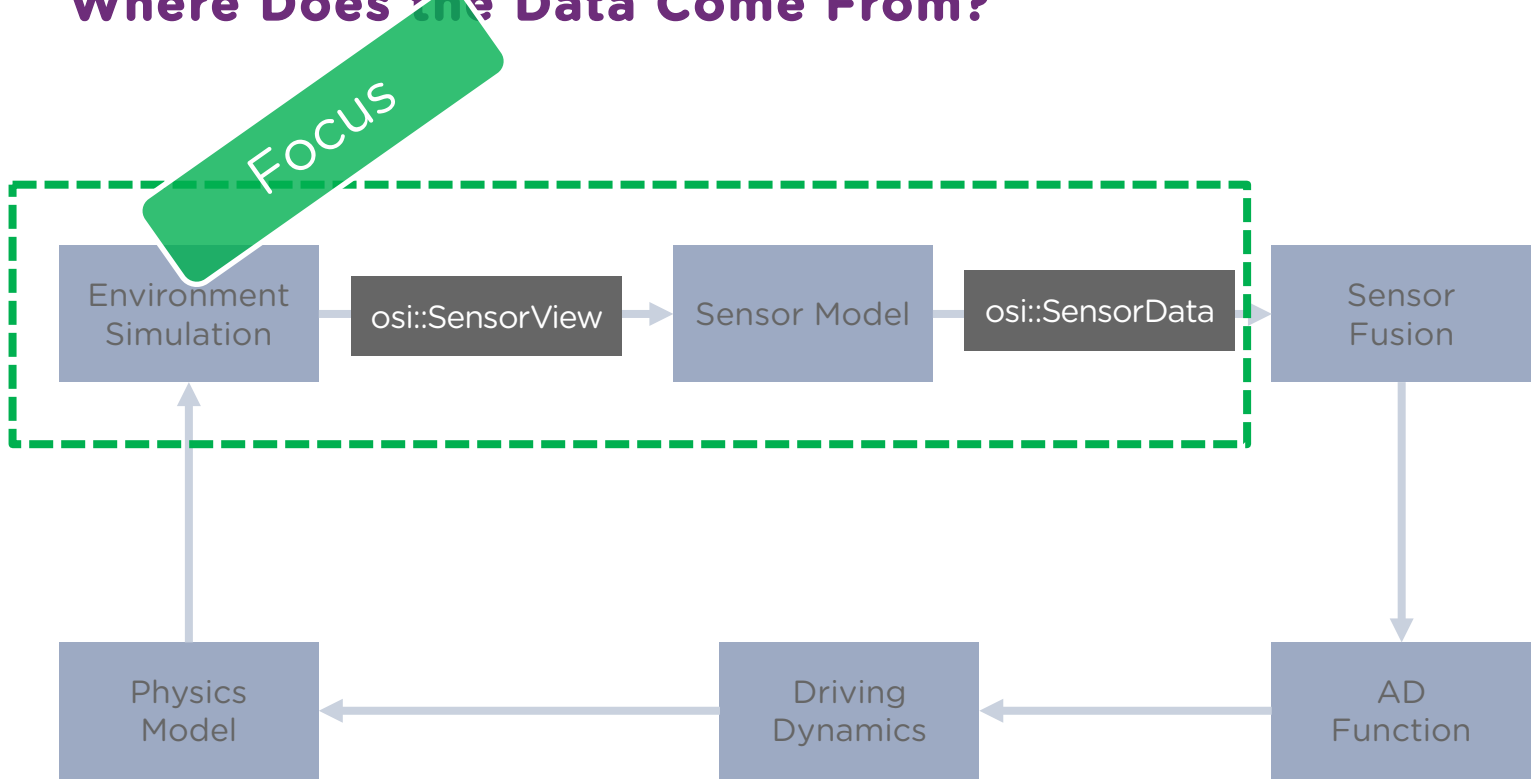
Hardware in the loop



Open Simulation Interface (OSI)



Where Does the Data Come From?



Where Does the Data Come From?

OpenDRIVE[®]
managing the road ahead

- Road Networks
- OpenDRIVE Core Team
- XML-based format (+ CSV/BIN companion format OpenCRG)

Navigation Data Standard

- MAP Data
- NDS e.V.
- SQLite-based format

OpenSCENARIO
bringing content to the road

- Dynamic Content
- OpenSCENARIO Core Team
- XML-based format

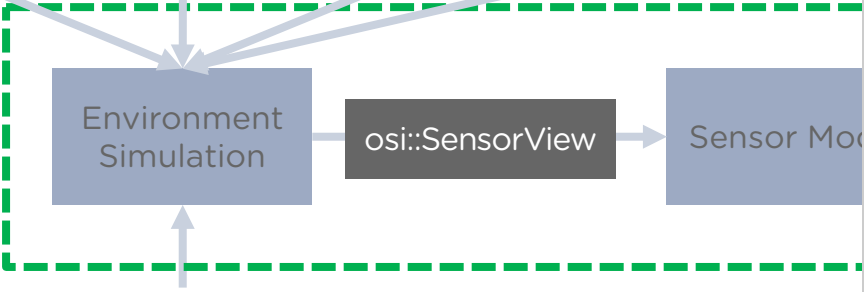
...

Open Simulation Interface

- Simulation World View
- OSI CCB
- Google ProtoBuf-based

ISO 23150

- Sensor Data in Vehicle
- ISO
- Binary



Where Does the Data Come From?

OpenDRIVE[®]
managing the road ahead

- Road Map
- OpenDRIVE Team
- XML-based (+ CSV) compact OpenDRIVE

Open Simulation

- Simulation
- OSI Compliant
- Google based

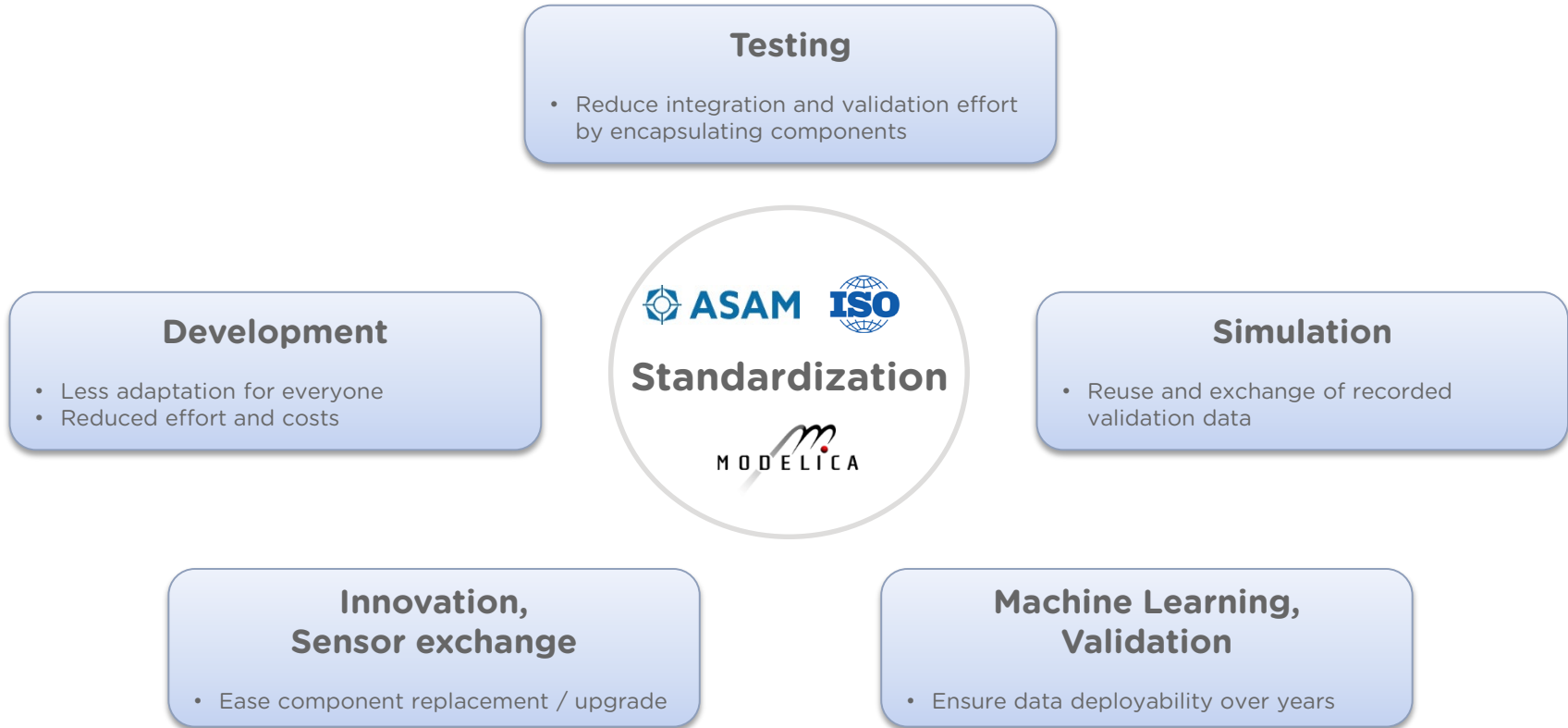
OpenSCENARIO



- **Different Standardization Bodies**
- **Different Syntax:** XML, Google ProtoBuf, SQLite, ...
- **Different Meta-Grammars:** XML Schema, Google ProtoBuf IDL, SQL, ...
- **Different Intended Uses:** File Storage vs. Communication vs. Simulation
- **But: Overlapping Content (e.g. Lanes, Vehicles, ...)**

... in Vehicle

Harmonized Standardization of Interfaces Offers Huge Potential



Harmonized Standardization of Interfaces...

... is necessary to handle the complexity of virtual test & validation.

... yields benefits *for OEMs, as well as for suppliers and tool vendors.*

... takes place in ISO (VDA), Modelica Association and at ASAM e.V..

... for sensor models happens by integrating the upcoming ISO Standard with OSI.

... for OpenDrive, OpenCRG, OpenScenario and OSI happens at ASAM e.V..

... for OpenDrive, OpenScenario and NDS should be coordinated between ASAM/NDS e.V.

... will be supported by recommendations on processes, best practices from ProStep iViP.