

VERIFICATION
VALIDATION
METHODS

Final Event 21 / 22 November 2023

System Design and V&V

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on the basis of a decision
by the German Bundestag



Open Context

 **Complexity**

 **Uncertainty**

 **Parameter Space Explosion**

 **Finite Resources**

Recap: Assurance Goals

Goal I: Systematic control of test space

↳ Feasibility

Goal II: Consistent Interfaces

↳ Interchangeability

Goal III: Shift to Simulation

↳ Efficiency

Goal IV: Argumentation

↳ Explainable Compliance

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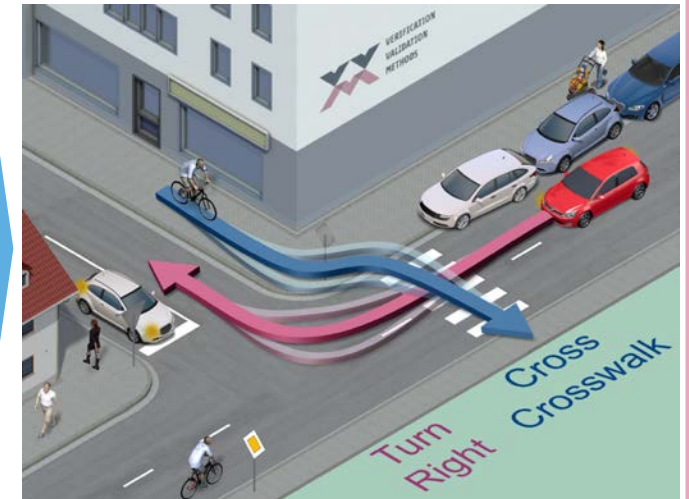
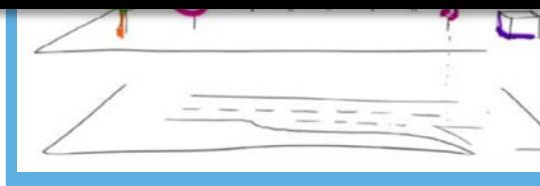
↳ Explainable Compliance

Open Context

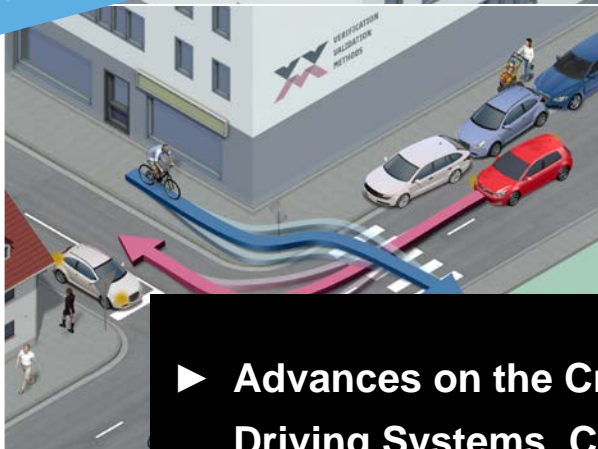


- ▶ **Operational Concept: ODD Description Creation, Ontology, Omega Format, Kai Storms, TU Darmstadt**
- ▶ **Scenario – based Reality Abstraction, Christoph Glasmacher, RWTH Aachen**

Systematic Abstraction of Reality



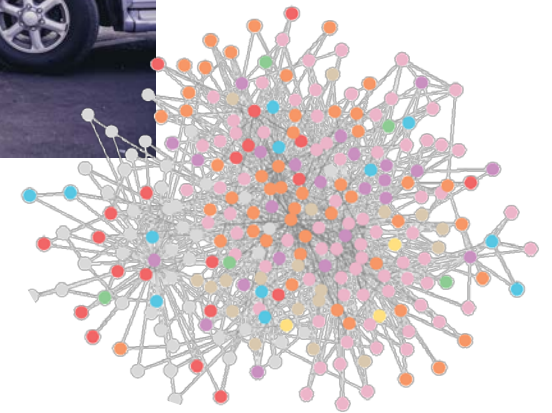
Infinite Parameter Space



How do we measure criticality?



- ▶ **Advances on the Criticality Analysis for Automated Driving Systems, Christian Neurohr, DLR**
- ▶ **Criticality Metrics, Martin Bollman, ZF**

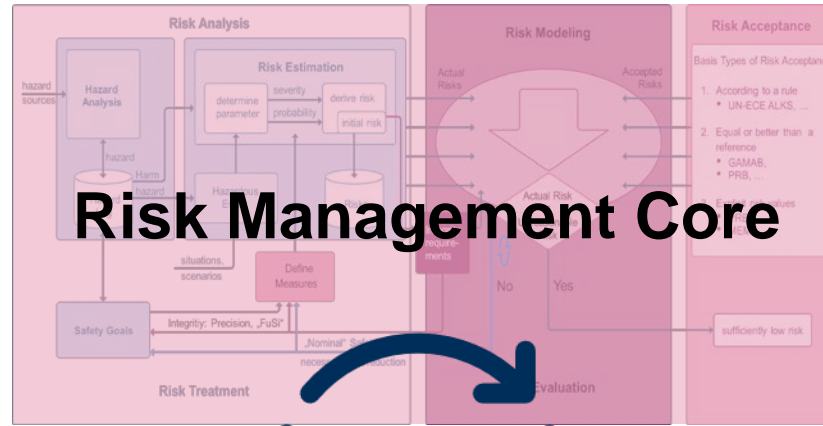
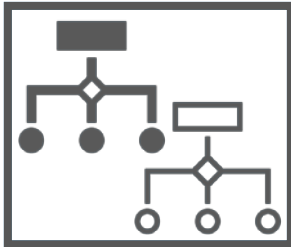


V&V in the design process



Target Behavior

Define Design Targets



Define Validation Targets

► Contributions to a Traceable Behavior Specification and Capability Analyses, Nayel Fabian Salem, TU Braunschweig





- ▶ **The Role of Argumentation - Overview Argumentation Strategies, Marcus Nolte, TU Braunschweig**
- ▶ **Building Blocks of the Argumentation: ODD Coverage in the Scenario based Approach, Tino Brade, Bosch**
- ▶ **Building Blocks of the Argumentation: Behavior Specification, Nayel Fabian Salem, TU Braunschweig**

Real World Layer Validation Artefact Validation Artefact PMT Concern PMT Concern PMT Concern *PMT = Processes - Methods - Tools

Thank you!

Jana Rehbein, Volkswagen
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A project developed by the VDA Leitinitiative
autonomous and connected driving

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