

Final Event 21 / 22 November 2023

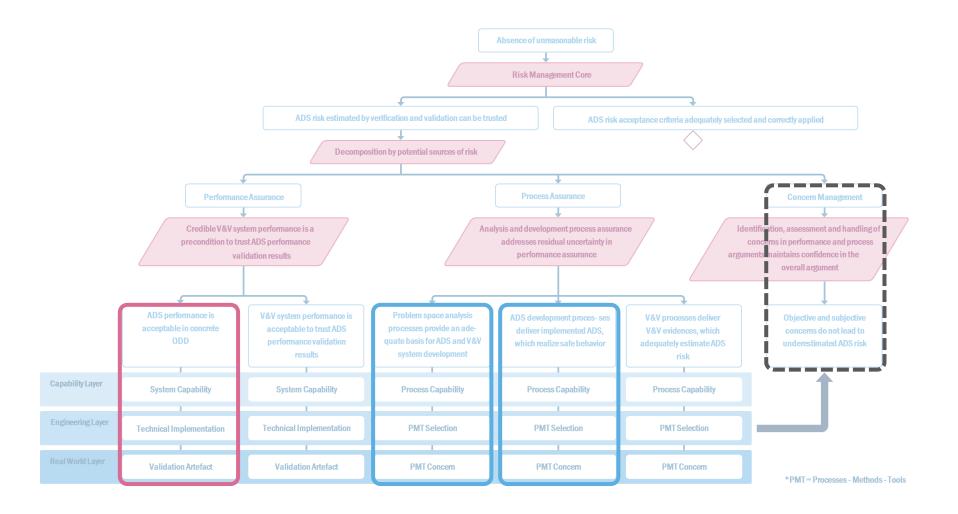
Building Blocks of the Argumentation: Behavior Specification

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How do Approaches Regarding Behavior Specification Support the Safety Argumentation?





Selected Building Blocks of the Argumentation



Performance Assurance

C_Prod_1: The ADS exhibits required capabilities so that it does not pose unreasonable risk in its ODD.

Process Assurance

C_Proc_1: Problem space analysis processes provide an adequate basis for ADS and V&V system development. C_Proc_2: ADS development processes deliver an implemented ADS, which realizes safe behavior.

Concern Management

C_Conf_1: Objective and subjective doubts on the realworld application of the methods are adressed.

Selected Building Blocks of the Argumentation



Is the ADS capable enough?

Do we understand the problem space?

Did we develop an appropriate solution?

What could we have missed?



ADS performance assurance

Definition of unreasonable Risk

Definition of necessary risk reduction

Definition of safety goals

Definition of behavioral safety requirements

Satisfaction of behavioral safety requirements



ADS performance assurance

Definition of unreasonable Risk

Definition of necessary risk reduction

Definition of safety goals Definition of ehavioral safety requirements

Satisfaction of behavioral safety requirements

Identification of hazardous events

Risk assessment of hazardous events



ADS performance assurance

Definition of unreasonable Risk

Definition of necessary risk reduction

Definition of safety goals

Definition of behavioral safety requirements Satisfaction of behavioral safety requirements

Identification of hazardous events

Risk assessment of hazardous events

Hazardous events within target behavior

Hazardous events deviating from target behavior

Hazardous events independent from target behavior

Risk Log

The behavior specification enables a more structured and efficient identification of hazardous events.

cf. R. Graubohm, T. Stolte, G. Bagschik, and M. Maurer, "Towards Efficient Hazard Identification in the Concept Phase of Driverless Vehicle Development", 2020 IEEE Intelligent Vehicles Symposium (IV), pp. 1297-1304, Okt. 2020, doi: 10.1109/IV47402.2020.9304780



ADS performance assurance

Definition of unreasonable Risk

Definition of necessary risk reduction

Definition of safety goals

Definition of ehavioral safety requirements Satisfaction of behavioral safety requirements

Identification of hazardous events Risk assessment of hazardous events

Risk of known hazardous events

Risk Log

Risk of unknown hazardous events

The Risk Management Core applied to the behavior specification enables early risk assessment of hazardous events.



ADS performance assurance

Definition of unreasonable Risk

Definition of necessary risk reduction

Definition of safety goals

Definition of behavioral safety requirements

Satisfaction of behavioral safety requirements



Process assurance

Problem space analysis

ADS design

V&V processes



Process assurance

Problem space analysis

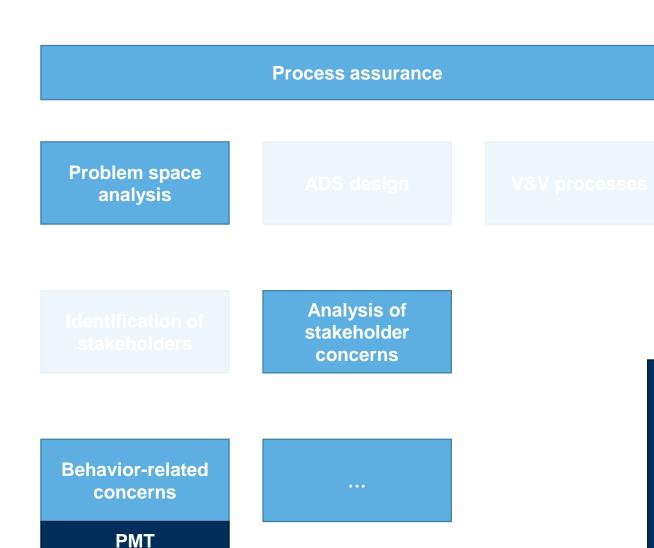
ADS desian

V&V processes

Identification of stakeholders

Analysis of stakeholder concerns





The Semantic Norm Behavior
Analysis is a method to support the
analysis of behavior-related
stakeholder concerns.

PMT: Processes, Methods, Tools



Process assurance

Problem space analysis

ADS design

V&V processes

Specification of target behavior

PMT

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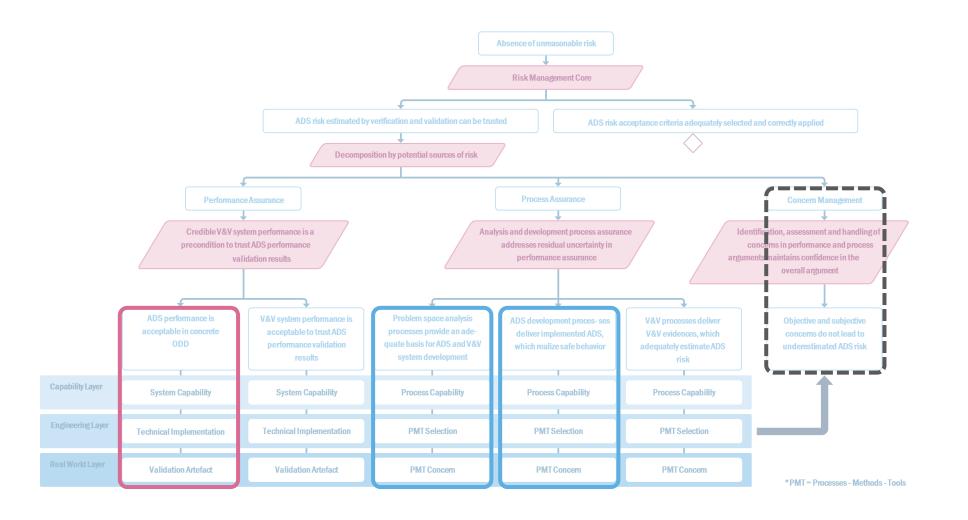
The Semantic Norm Behavior
Analysis together with the
Phenomenon-Signal Model
are methods to support the
specification of target
behavior.

The PSM Graph Builder is a tool to support the specification of target behavior.

PMT: Processes, Methods, Tools

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Thank you!

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