

AI Engineering from Requirements to Demonstration

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Motivation

The central challenge of work package Evaluation is the development, implementation, and application of a comprehensive evaluation concept with objective metrics for the safety of the methods developed as shown in Figure 1. The effectiveness of the continuous evaluation and the methods developed in the other work packages will be demonstrated using real test vehicles as well as in simulations.

Demonstrators

The demonstrator vehicles used serve as part of the AI engineering toolchain being evaluated and can fulfill various roles in the lifecycle of an AI component, such as a measurement vehicle for collecting training data during the development phase or a test vehicle for updating the AI component during the deployment phase. The vehicles are intended here as add-ons and are part of the toolchain.

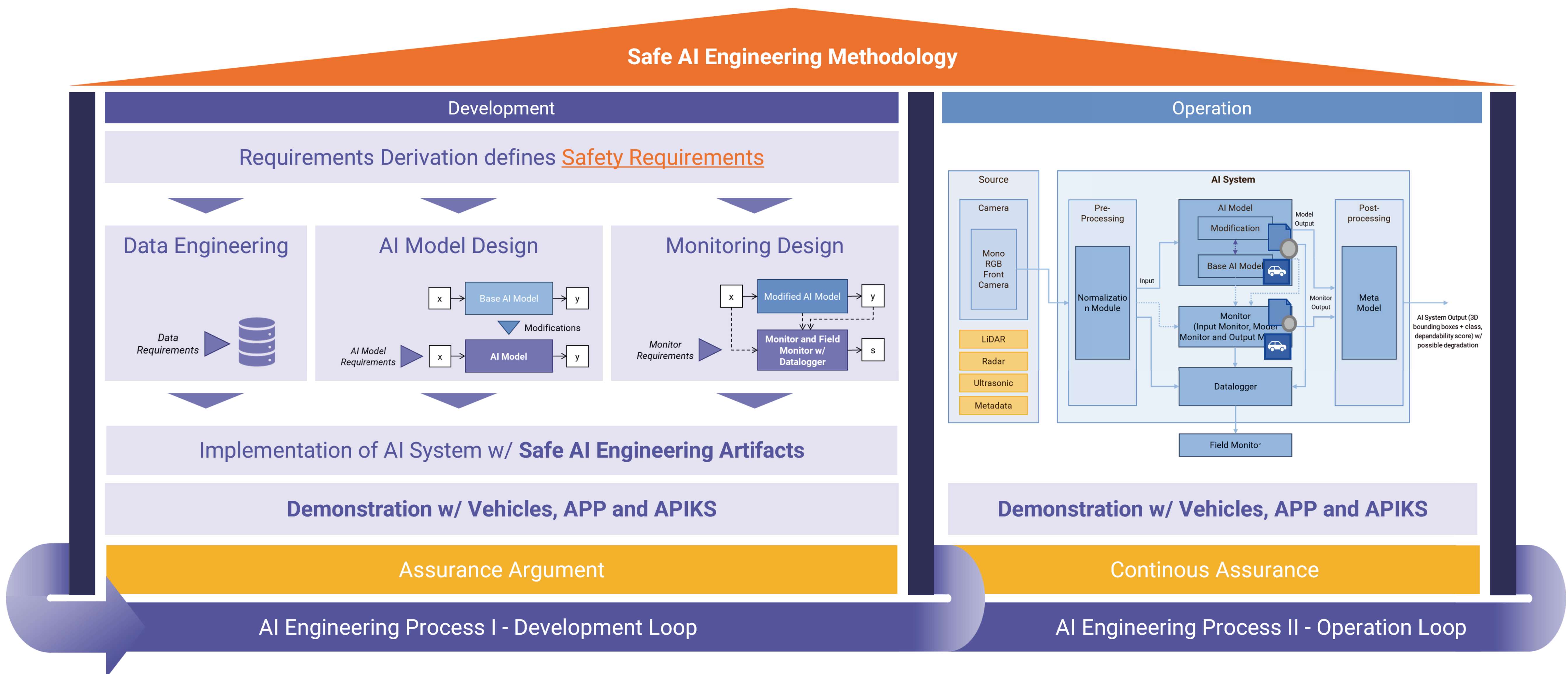


Figure 1: WP7 demonstrates Process and AI System Integration

Use Cases

- Use Case #1 uses an AI perception function to detect pedestrians using 2D bounding boxes. The focus here is on analyzing various scenes featuring a stationary pedestrian on a straight road—possibly taking into account a partially obscuring parked vehicle—and a stationary ego vehicle.
- Use Case #2 deals with an AI perception function for detecting pedestrians using 3D bounding boxes. As an extension of the first use case, it examines a scenario involving a dynamic pedestrian on a straight road with a stationary ego vehicle.
- Use Case #3 uses an AI perception function to detect pedestrians using 3D bounding boxes and, if necessary, tracking methods. The most complex use case concludes with an analysis of a scenario involving multiple dynamic pedestrians at an intersection with a dynamic ego vehicle.

Interfaces

Standardized interfaces were developed to integrate the software components created during the project. The goal was to establish a unified technical foundation that would allow the AI models from WP5, the monitoring components from WP6, and the various evaluation and benchmarking tools to communicate with one another within a shared infrastructure.

Implementation and Benchmarking

The monitoring methods developed in the project require continuous analysis of the collected evidence and of system safety throughout the development and approval process. Data analytics and cloud-based benchmarking tools are integrated into the test platforms. The benchmarking tools developed are then applied to the methods and combinations of methods that have been developed in order to evaluate and compare them.

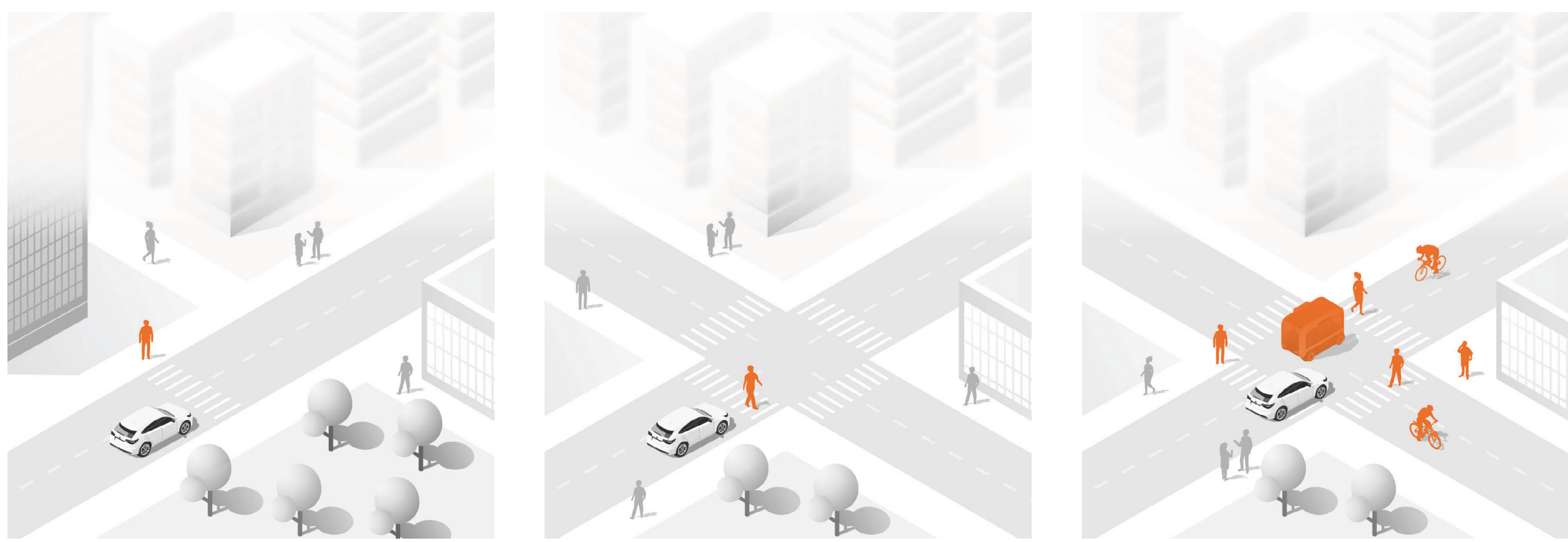


Figure 2: Detection of pedestrians in increasing complex environmental and traffic scenarios

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Safe AI Engineering is a project of the KI Familie. It was initiated and developed by the VDA Leitinitiative autonomous and connected driving and is funded by the Federal Ministry for Economic Affairs and Energy.



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