Creation of Digital Twins of Urban Traffic Spaces for Sensor Simulation and Synthetic Data Generation

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Digital twins serve as basis for sensor simulation and generation of synthetic training data. A standard-based creation process enables reusability and exchangeability of the resulting assets:

Environment Reconstruction
Photogrammetry-based reconstruction of the static environment as 3D scene and derivation of a consistent simulation map.
Relevant Standards: Khronos glTF, OpenMATERIAL, ASAM OpenDRIVE

Asset Creation
Creation of static and dynamic assets, based on photogrammetry and manual modeling.
Relevant Standards: Khronos glTF, OpenMATERIAL

Material Measurements
Measurement of material parameters for all relevant sensor modalities.
Relevant Standards: OpenMATERIAL

Validation of Models & Materials
Validation of 3D models and materials in terms of their consistency, structure and quality.
Relevant Standards: OpenMATERIAL

Scenario Creation
Derivation of simulation scenarios from real-world recordings.
Relevant Standards: ASAM OpenSCENARIO, ASAM OpenDRIVE

Scenarios & Synthetic Data

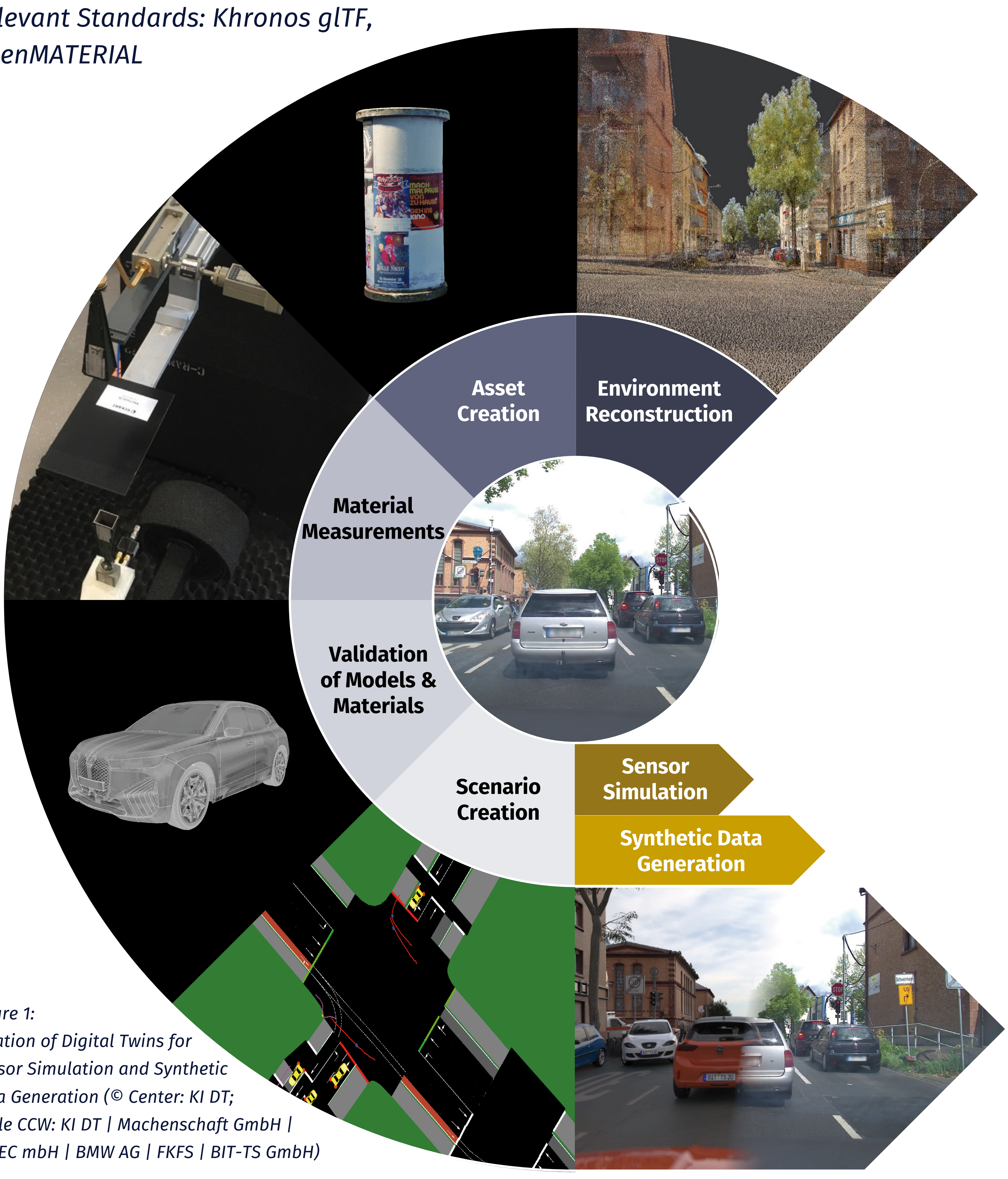

Figure 1: Creation of Digital Twins for Sensor Simulation and Synthetic Data Generation (© Center: KI DT; Circle CCW: KI DT | Machenschaft GmbH | PKTEC mbH | BMW AG | FKFS | BIT-TS GmbH)

Sensor Simulation
Physics-based sensor simulations based on re-simulated scenarios.
Relevant Standards: OpenMATERIAL

Synthetic Data Generation
Generation of synthetic training data based on re-simulated scenarios.

Partners

External partners

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