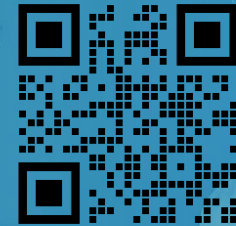




# DISTRIBUTED DATA- AND SERVICE- ECOSYSTEMS FOR V&V

Prof. Dr. Frank Köster

DLR-Institute for AI Safety & Security – Sankt Augustin and Ulm



# PEGASUS Family

PEGASUS + SET-Level + V&V Methods



- Methods and tools to test automated driving systems (highways and in urban environments)

## PEGASUS

<https://www.pegasusprojekt.de/en/home>

- Scope: **First methodological framework**
- Use-Case: L3/4 on highways
- Partners: 17



## VV-Methods



- Scope: **Methods, toolchains, specifications for technical assurance**
- Use-Case: L3/4/5 in urban environments
- Partners: 23 partners
- Timeline: 07/2019 – 06/2023

## SET Level



- Scope: **Simulation platform, toolchains, definitions for simulation-based testing**
- Use-Case: L3/4/5 in urban environments
- Partners: 20 partners
- Timeline: 03/2019 – 10/2022

+ future projects of the PEGASUS Family

2016

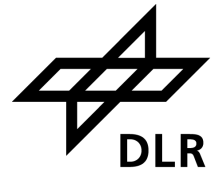
2019

Time

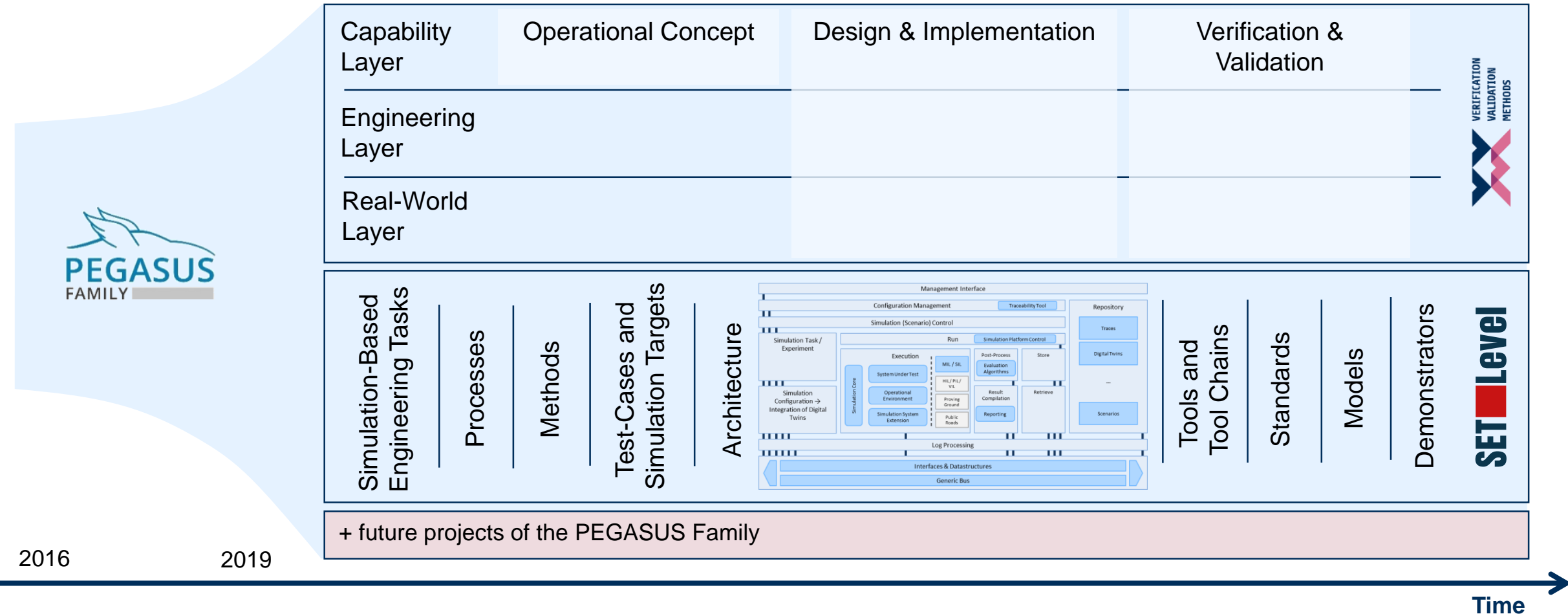


# PEGASUS Family

PEGASUS + SET-Level + V&V Methods



- Methods and tools to test automated driving systems (highways and in urban environments)



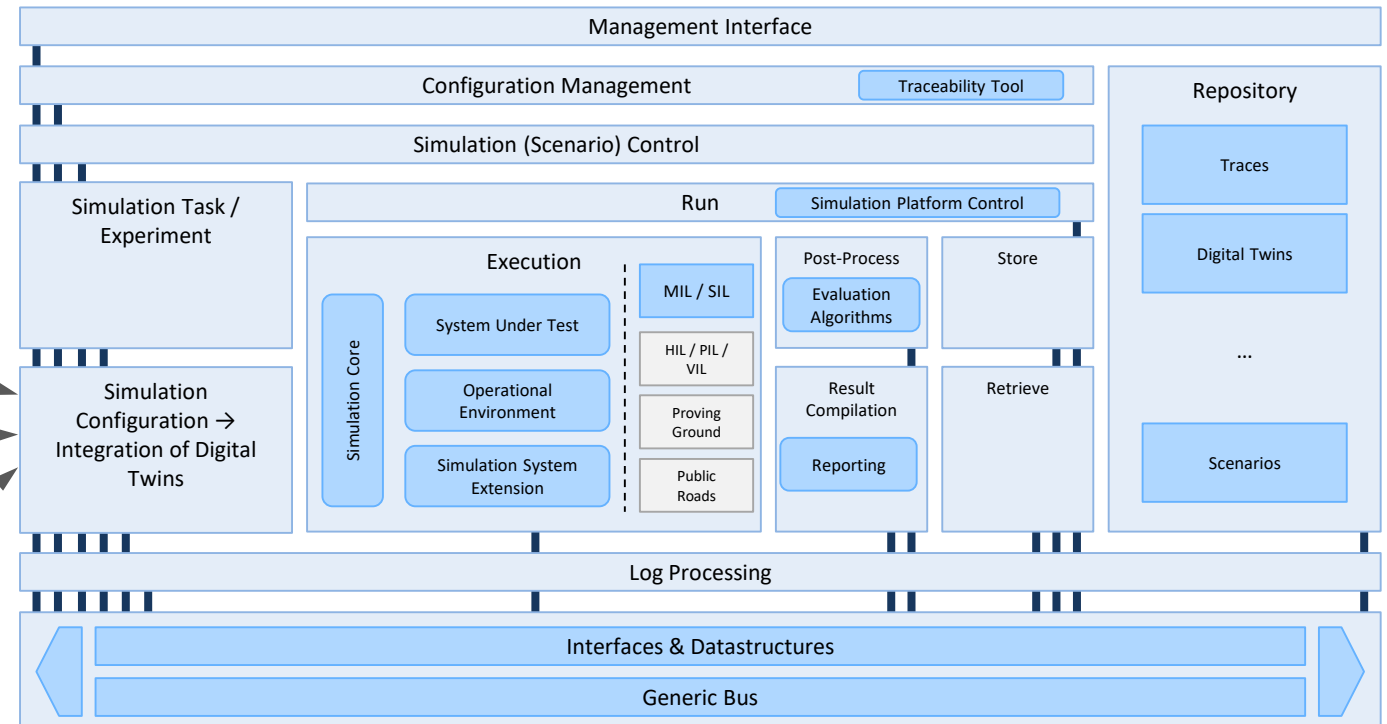
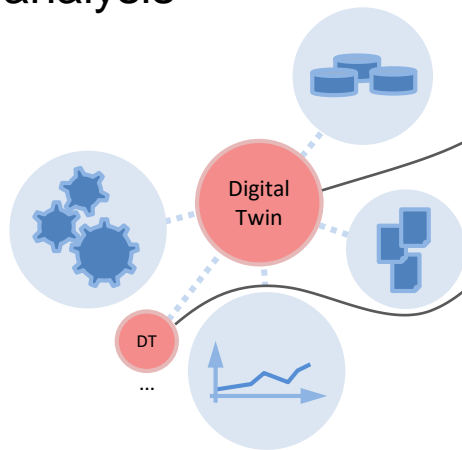
# PEGASUS Family – Focus on SET-Level

PEGASUS + SET-Level + V&V Methods

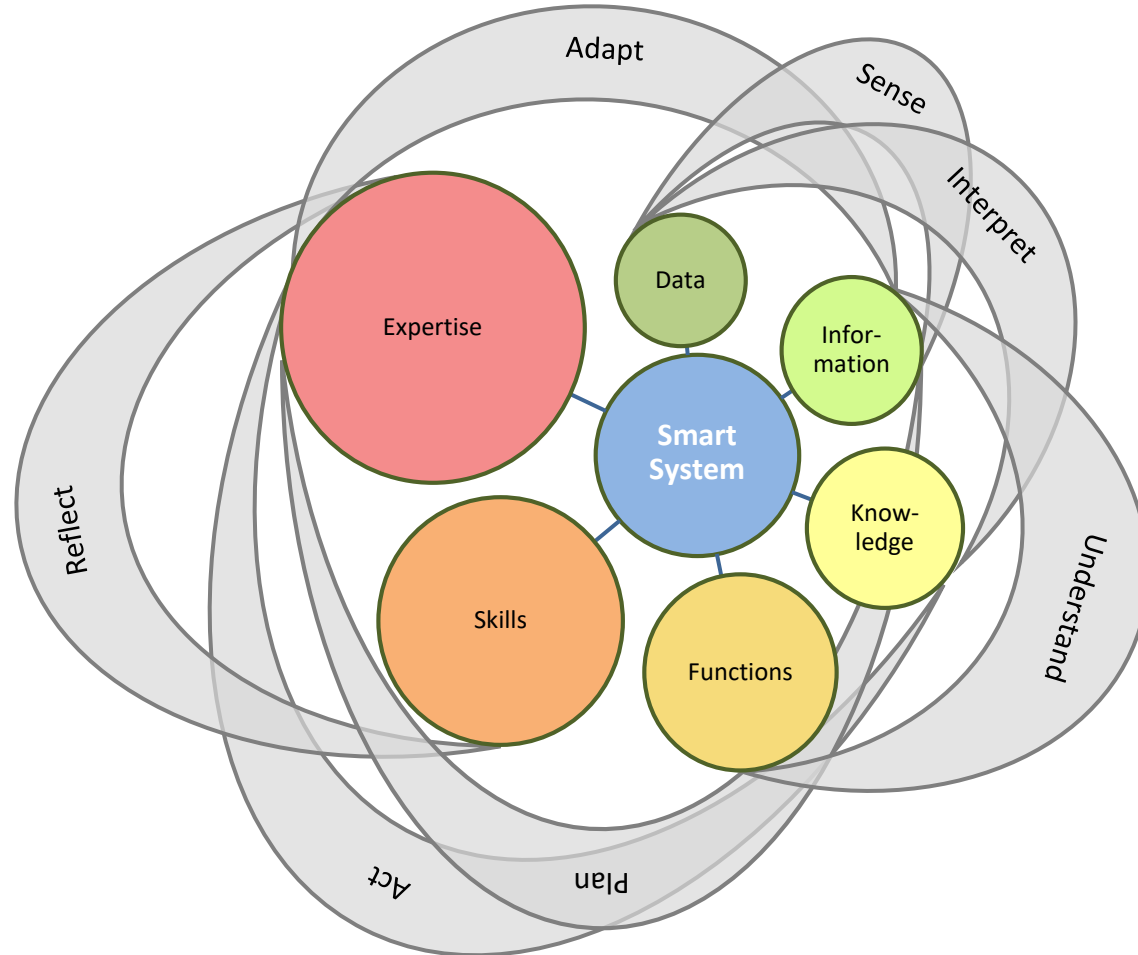


- Beside real-world data also synthetic data are of growing relevance

- Collect and refine requirements
- Prepare training & validation data
- Completion of safety argumentation
- Define deployment strategies
- Investigate and understand field observations – root-cause analysis
- ...



# Safeguard AI-based Perception Functions



Methods and measures to safeguard AI-based perception functions



Processes, methods and tools for generating and enriching training and validation data

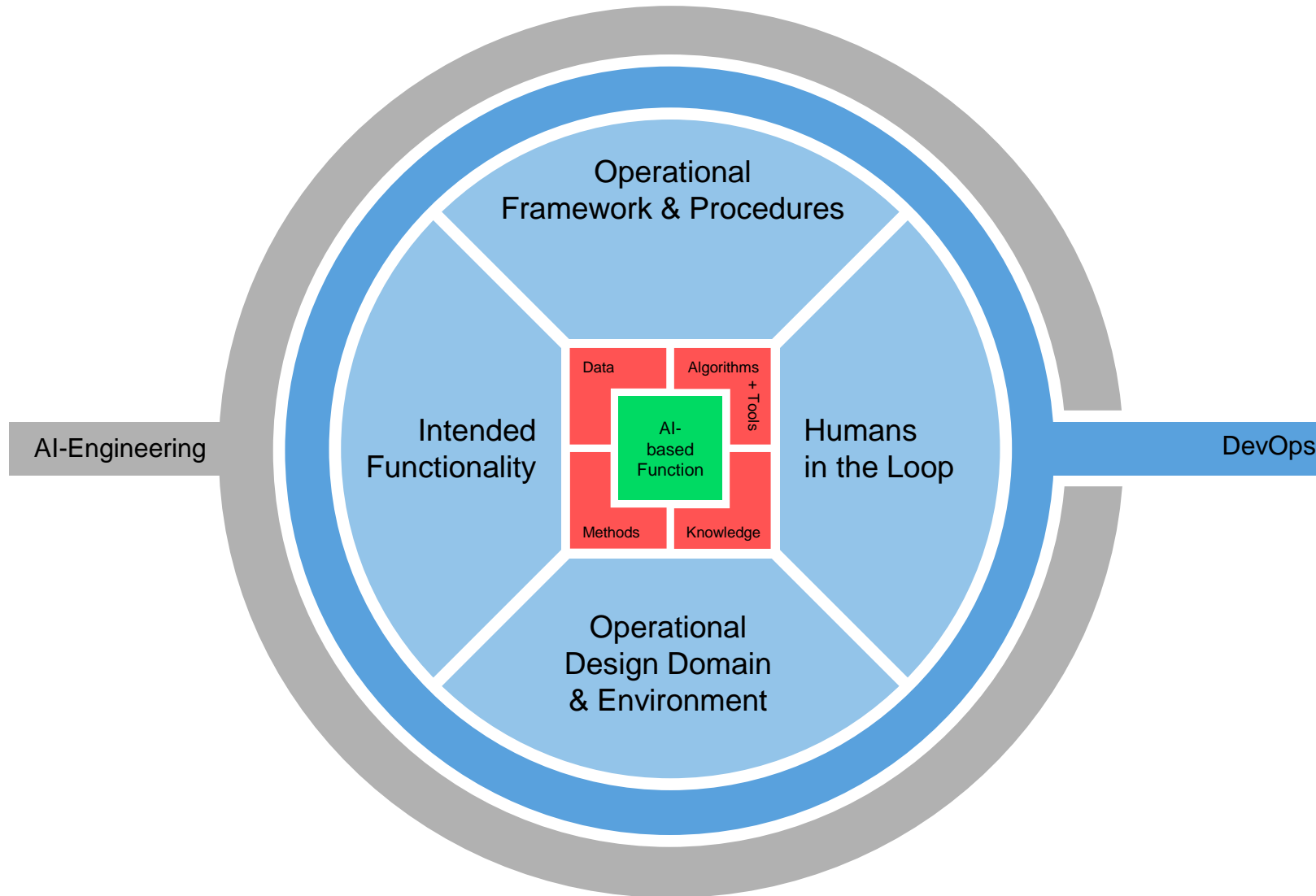


Integration of knowledge with machine learning methods



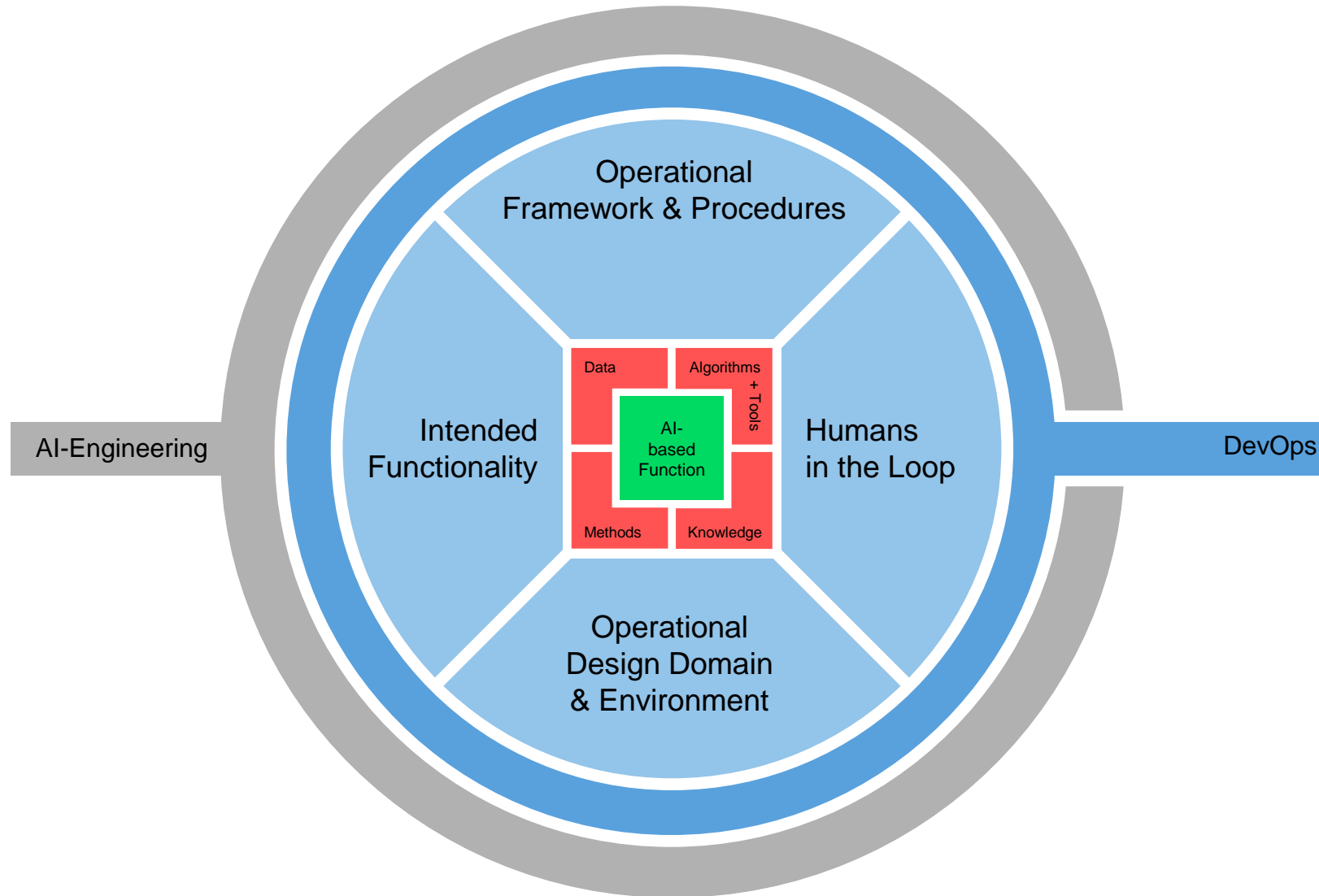
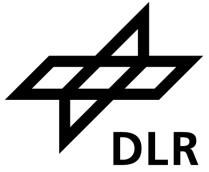
Expansion and transformation of existing AI modules according to new requirements



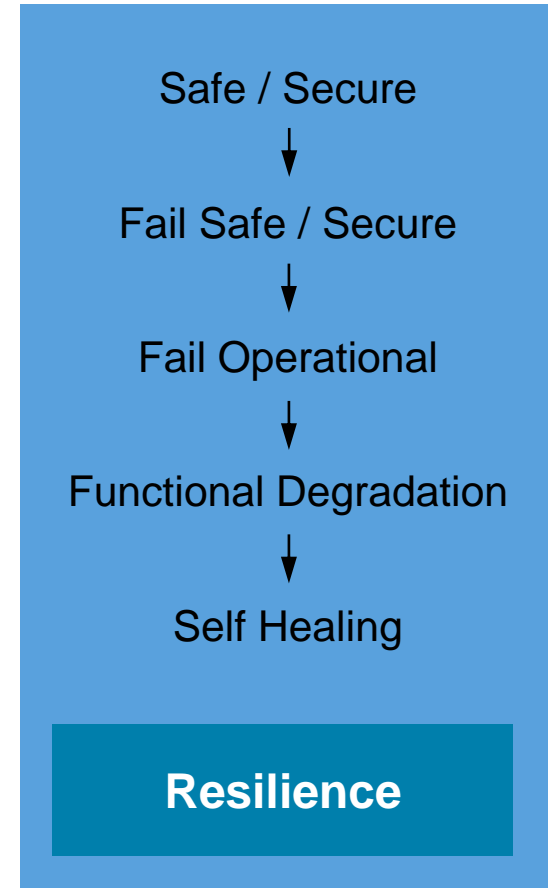


# Playing Field

Striving for Safety and Security ... but can we win?

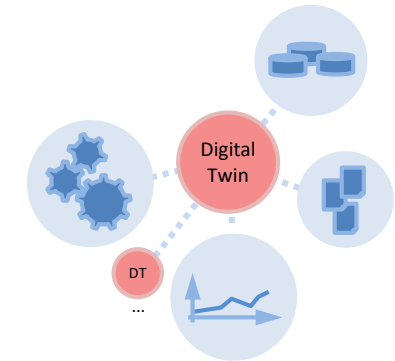
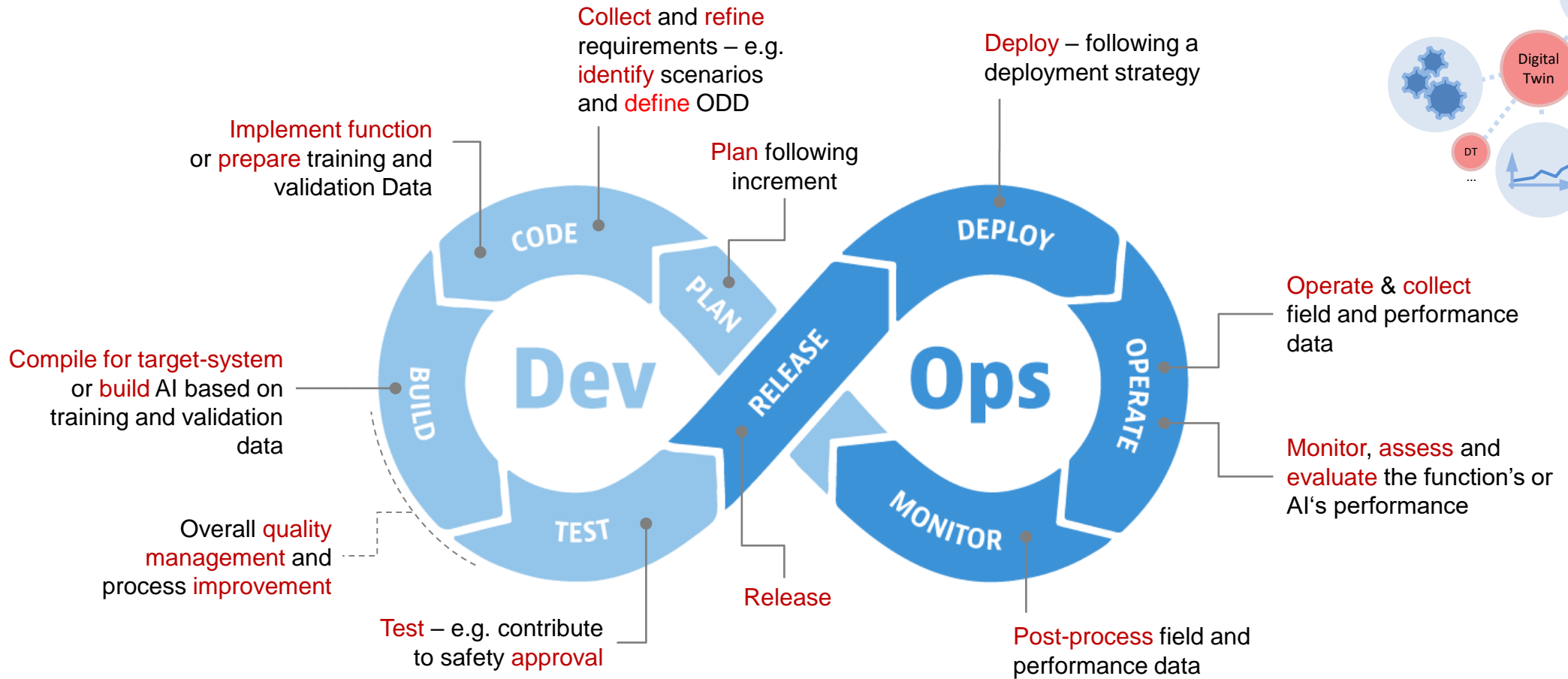


Continuous Improvement



# It's not Done when it's Done!

There is no One-Shot Solution → DevOps ... and ... Digital Twins are Essential

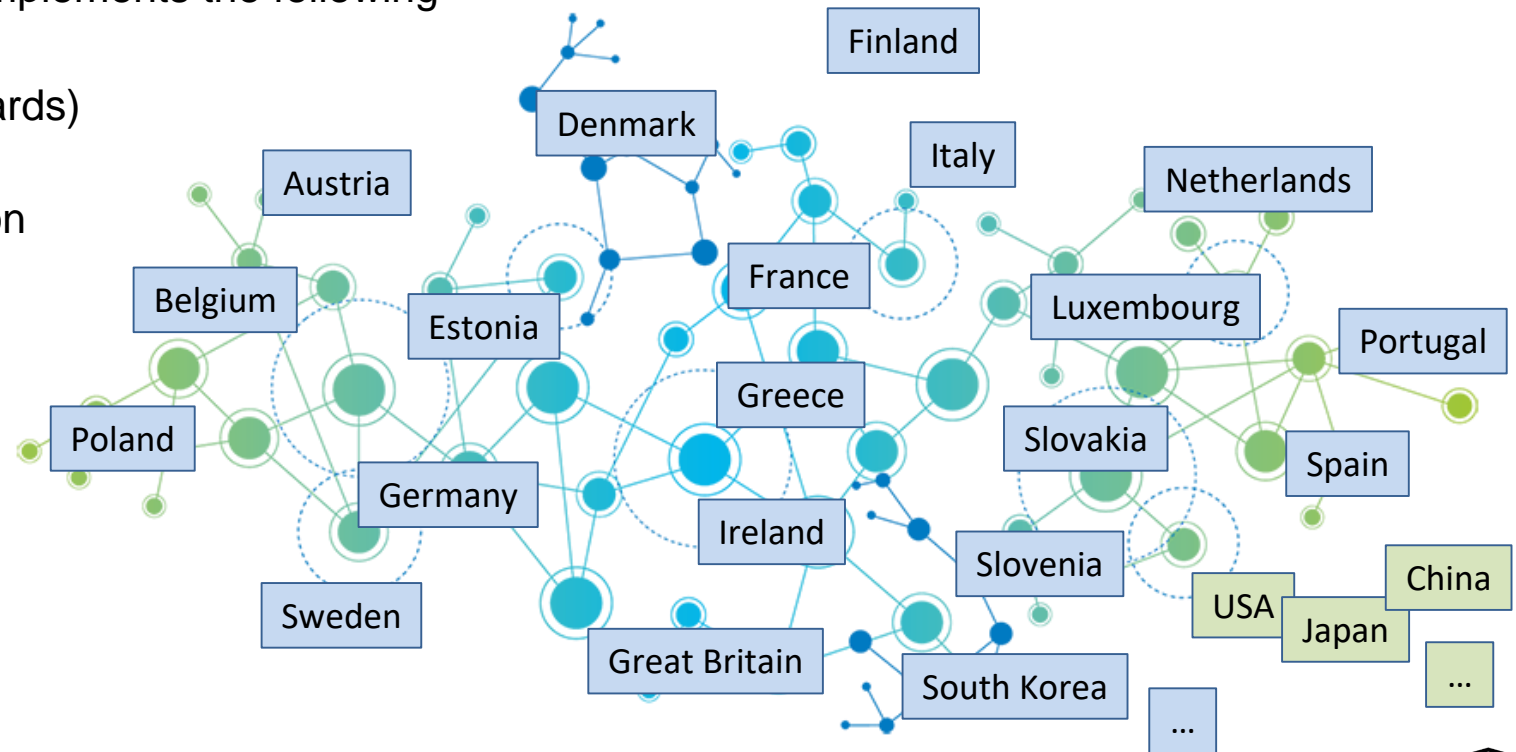




# Data- and Service-Ecosystems & Data Spaces ( )

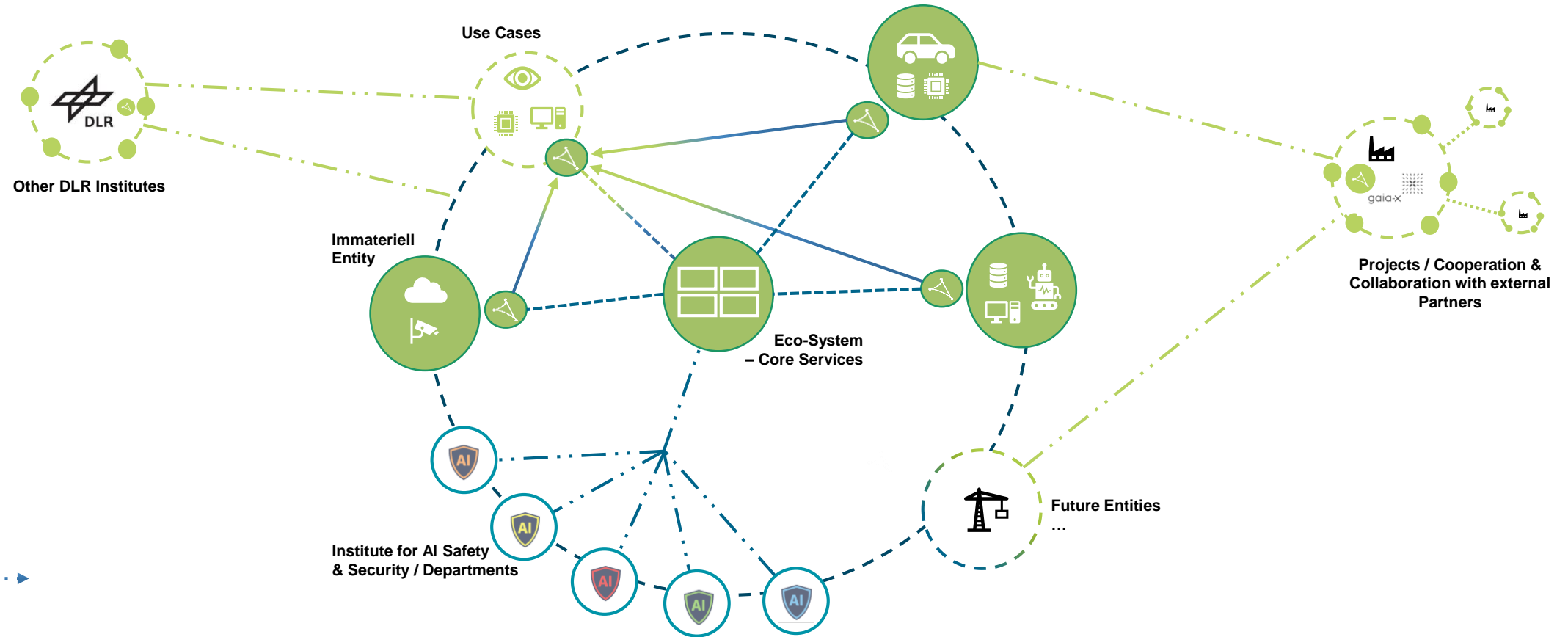


- **Open cloud/edge-based data and service-ecosystems** will be the “home” of many digital services/products that will more and more rely on AI-based components – e.g. GAIA-X
  - GAIA-X will be the basis for a digital ecosystem in which data and services can be made available, integrated/merged, shared and used securely and with an ultimate level of trust.
  - Based on European values, GAIA-X implements the following guiding principles:
    - data protection (European standards)
    - ultimate authenticity and trust
    - sovereignty and self-determination
    - openness and transparency
    - free market access as well as European stability and growth
    - modularity and interoperability
    - usability
  - European/international visibility and impact



# Data- and Service-Ecosystems & Data Spaces ( )

- Data Spaces | Data- and Service-Ecosystems



Information



Data Plane

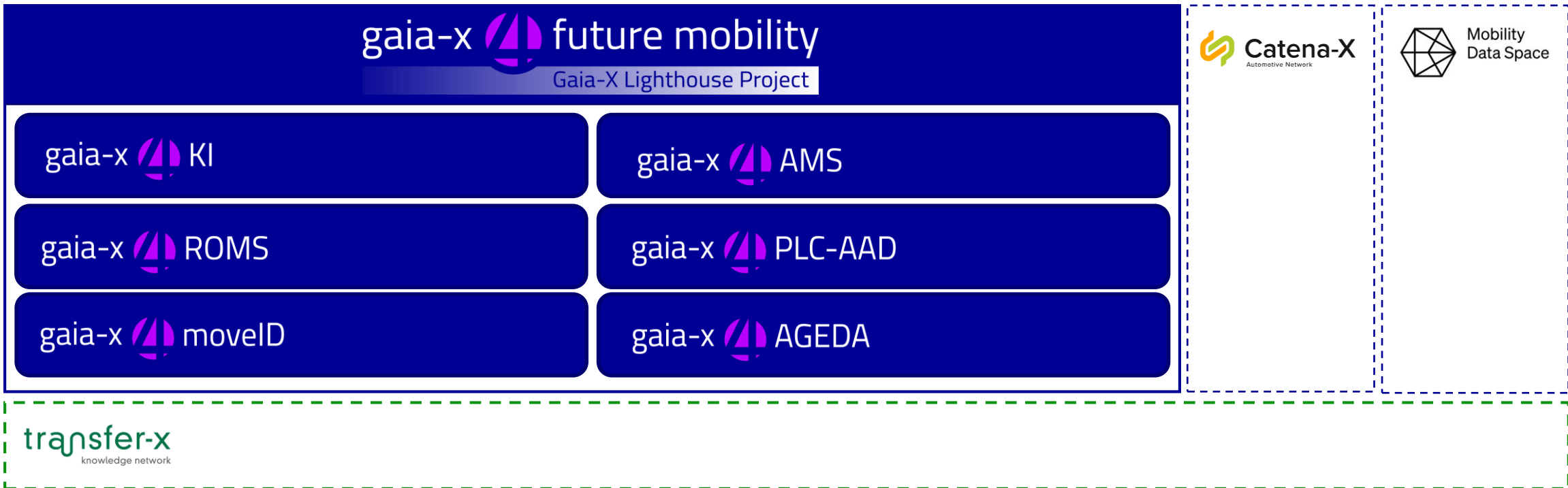


Meta Data









# Family of Projects – Relation to other Domains / Initiatives

Hannover Messe | 22.-26. April  
2024 | Hall 8 | Booth F25



# Family of Projects – Synergies by Design

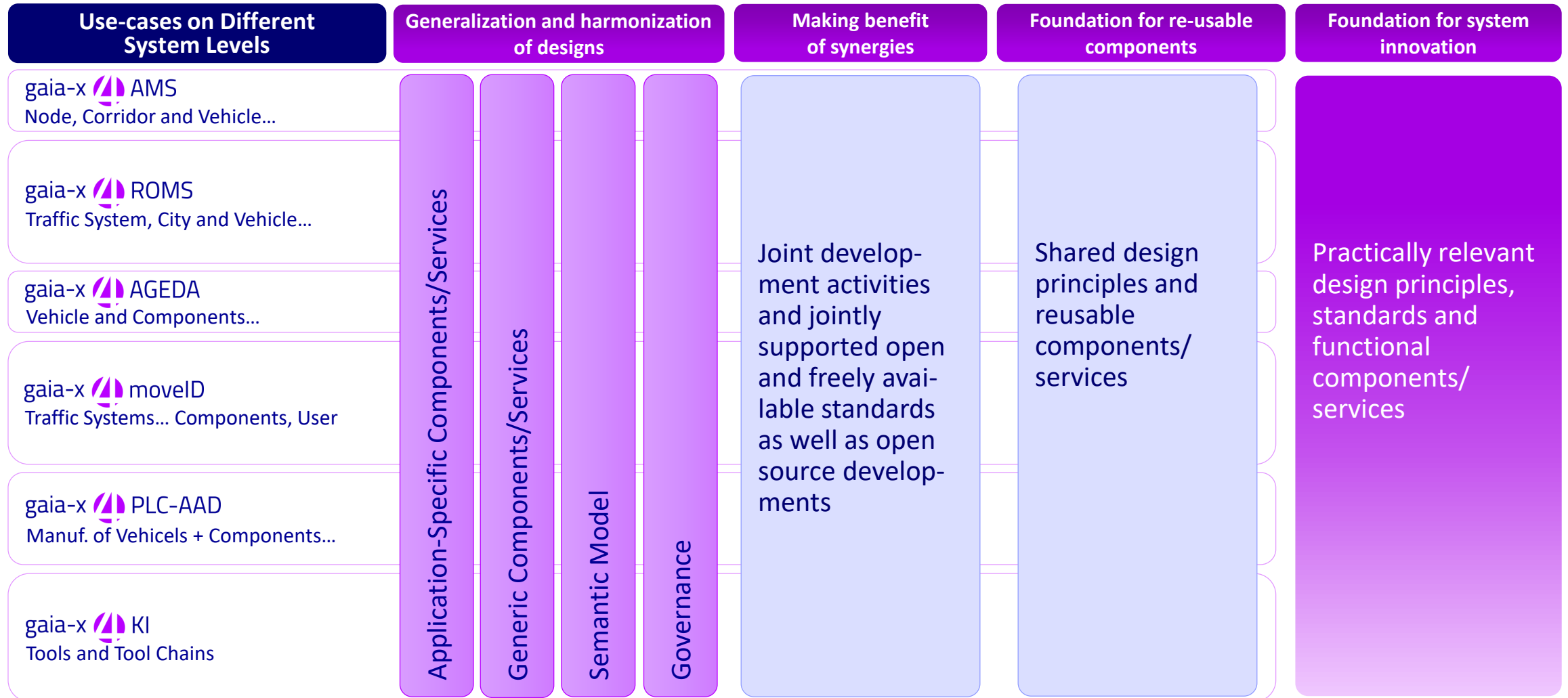
Hannover Messe | 22.-26. April  
2024 | Hall 8 | Booth F25

Use-cases on Different System Levels	Backend System	Traffic Network	Traffic Nodes / Edges	Vehicle System	Subsystem	Component
gaia-x  AMS Node, Corridor and Vehicle...	Safe/Secure Cooperation of Automated Vehicles			Connected and Safe/Secure – Rescue Corridor		
gaia-x  ROMS Traffic System, City and Vehicle...				RO of Vehicles		
				RO of Fleets		
				Smart Managed Public Transport Fleet		
				Smart Managed Freight Fleet		
gaia-x  AGEDA Vehicle and Components...				Vehicle as Edge Device		
				Embedded Gaia-X		
gaia-x  moveID Traffic Systems... Components, User	DLT-Network		Vehicle Data Collection			
	Traffic Infrastructure Mgmt.					
	Smart Parking					
	Zoning					
gaia-x  PLC-AAD Manuf. of Vehicels + Components...				Sensor Validation		
				Bullwhip Mitigation		
				Digital Twin based Predictive Maintenance		
gaia-x  KI Tools and Tool Chains				Automated Optical		
				Digital Twin – Camera		
				SIEM		
				Scenario Identification		



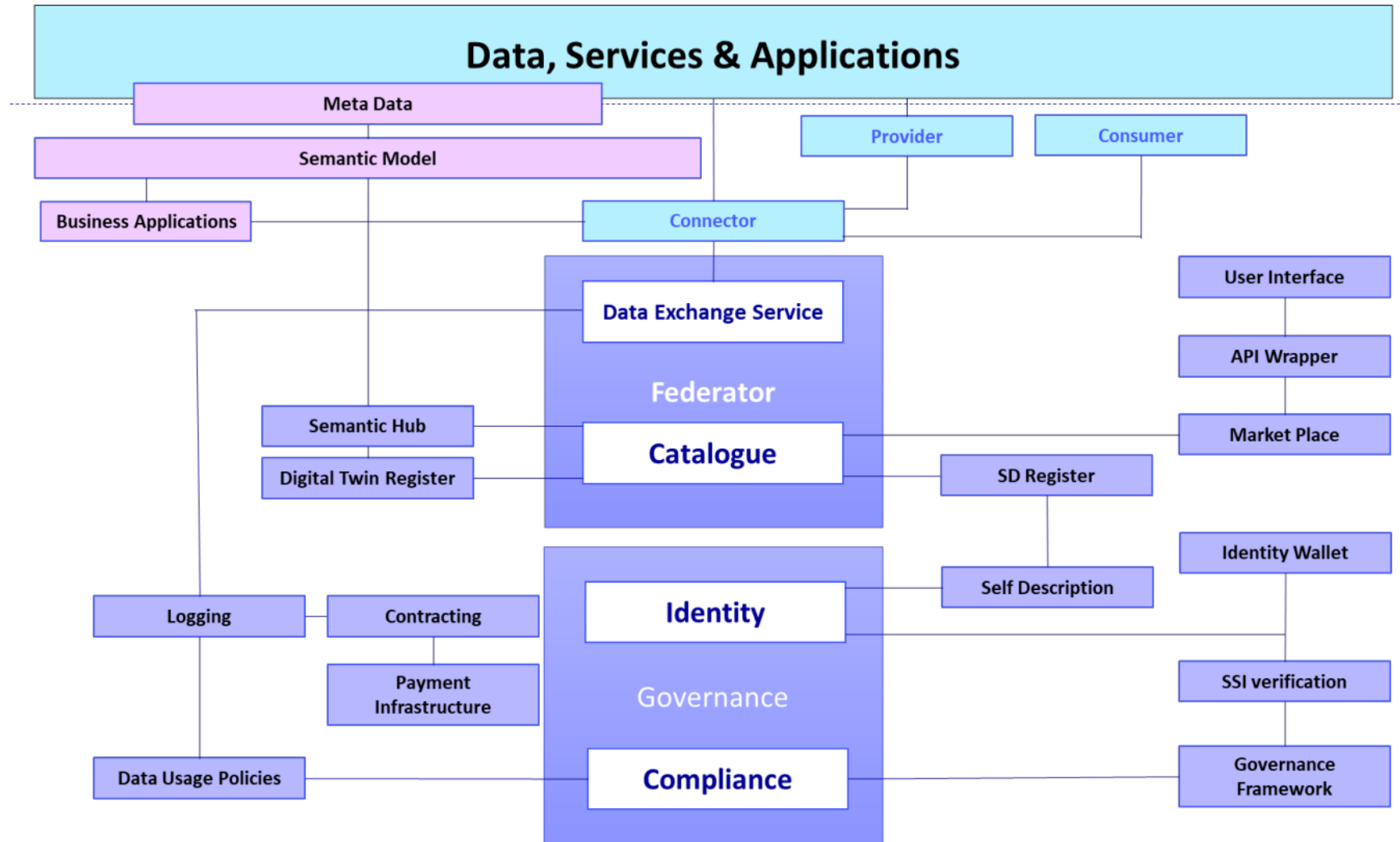
# Family of Projects – Synergies by Design

Hannover Messe | 22.-26. April  
2024 | Hall 8 | Booth F25














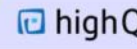



























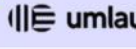

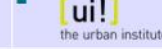







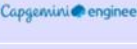
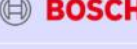







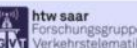
















# Family of Projects – base-x Architecture

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# Current Participants – Network

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2024 | Hall 8 | Booth F25

Industry & SMEs											Gaia-X 4 KI 
											Gaia-X 4 AMS 
											
											
											
											
Research & Universities											Gaia-X 4 PLC-AAD 
											
Public Sector & Others											Gaia-X 4 AGEDA 





**THANK YOU  
FOR YOUR ATTENTION**

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