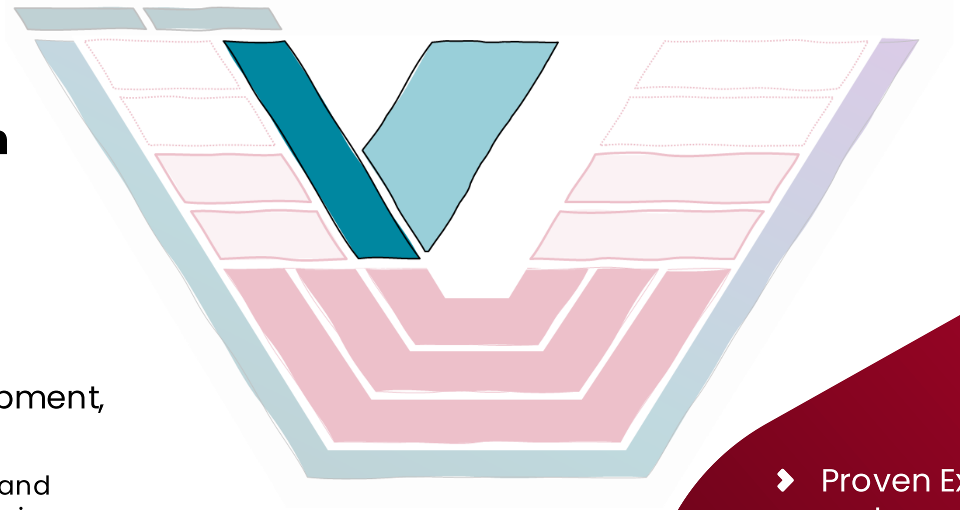
FEV's holistic AI-integrated system development methodology (SDM)

FEV SIGNATURE SOLUTIONS



Efficiently develop and tailor your system hardware and controls in an early development phase

FEV offers

- Methodology for AI-integrated system development, leveraging frontloading potentials
  - AI-driven: Automates and optimizes system design and controls through combined multi-domain processes in use-case environment
  - AI-enabled development guidance : Uses generative AI (GenAI) for automation, requirement extraction, and use-case derivation
  - Advanced simulation capabilities: Includes Bayesian optimization, genetic algorithms, and machine learning for performance and efficiency gains
  - Extensive database and deep system knowledge
- Customization for various applications in automotive, aerospace, rail and energy sector

Why FEV

- Proven Expertise: 20+ years of experience in system optimization and control strategies
- White-Box option: Enables you to integrate and extend the methodology
- Automated & AI-supported workflow: Reduces development time by utilizing machine learning-based design parameter optimization
- End-to-end simulation & validation: Delivers optimized design parameters, control strategies, and KPIs for energy efficiency, durability and performance

FEV's SDM features use-case extraction, system hardware parametrization and controls integration in a virtualized development methodology

FEV propulsion

FEV'S SDM AS AI-INTEGRATED SYSTEMS ENGINEERING METHODOLOGY

01

Stakeholder requirements and system targets

FEV Gen AI Tool

02

Architectural and use-case definitions

FEV Gen AI Tool

03

System and component Sizing and parametrization

System Designer Tool

04

FEA component simulation and system evaluation

System Designer Tool

05

Control architecture and function parametrization

System Controls Tool

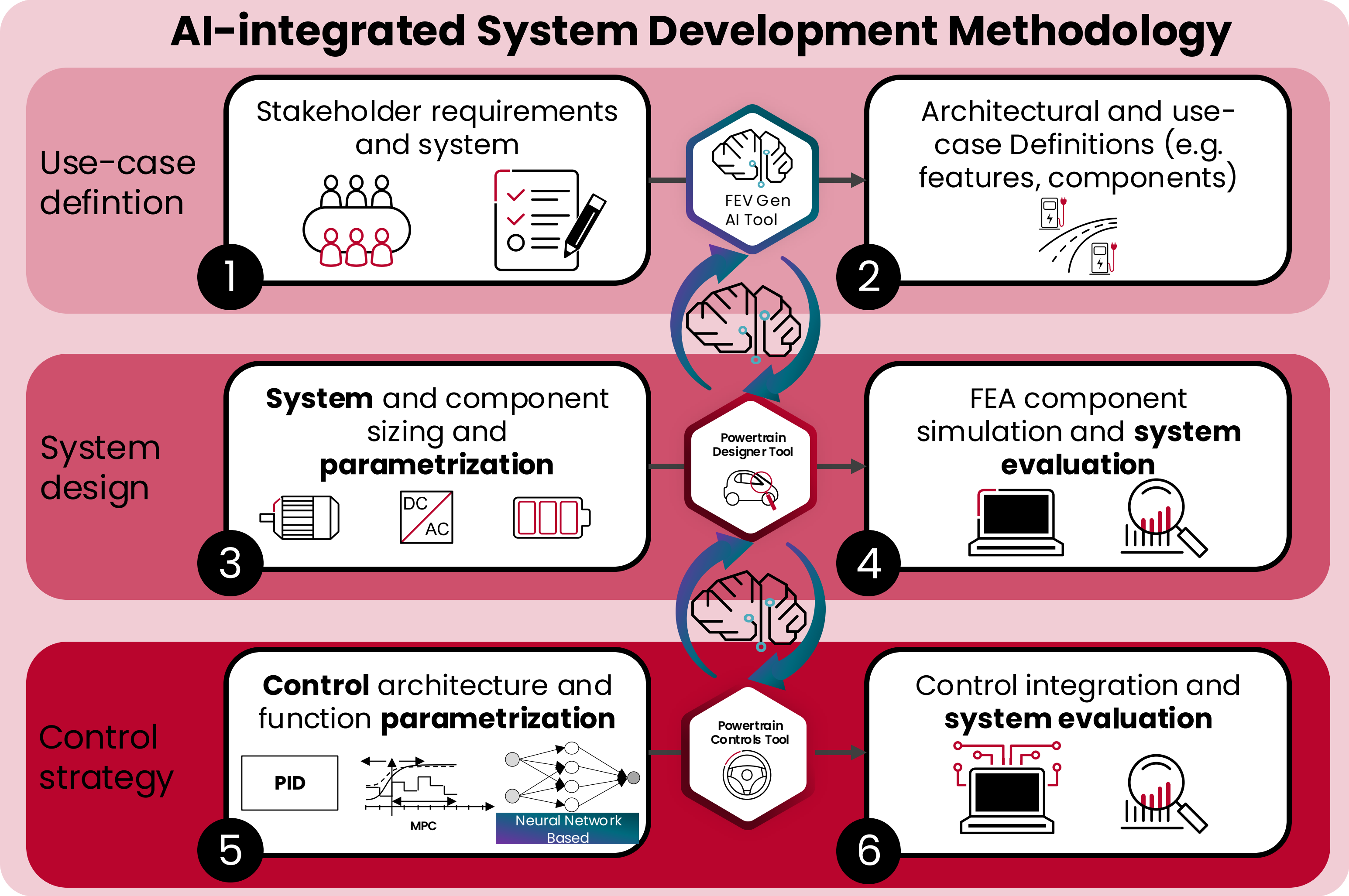
06

Control integration and system evaluation

System Controls Tool

SDM as FEVs seamless concept design and control tool for optimal system parametrization

LAYERED SDM STRUCTURE



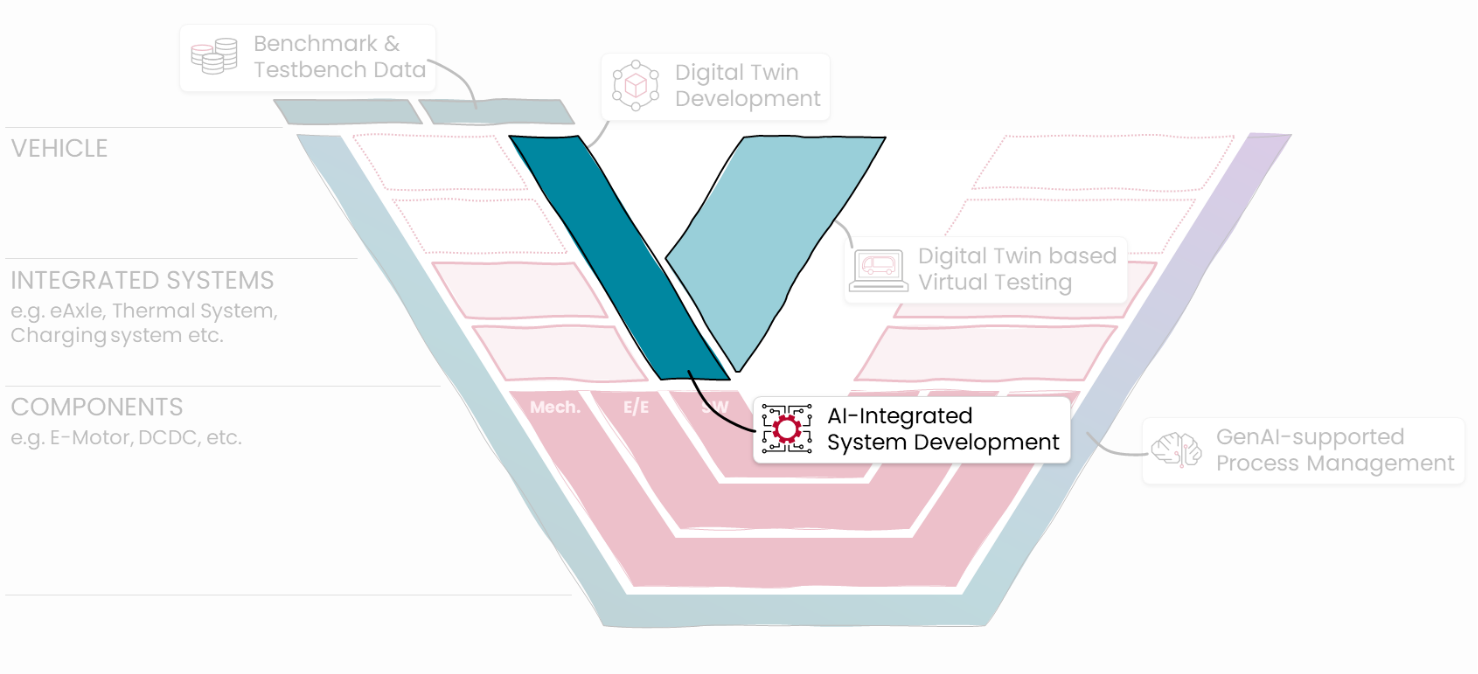
ADDED VALUE OF FEV’S SDF

- **Challenge:** System development suffers from multi-dimensionality of conceptional solutions in hardware and control domain regarding derived use-cases
- **Solution:** Integration of FEV’s SDM in the system development process
- **Benefits:** Leveraging frontloading capabilities and cost reduction potentials for system right-sizing by
  - combining design and controls optimization hierarchically in virtualized use-case environment by overarching AI interfaces
  - GenAI support of use-case and architectural derivation from stakeholder requirements

FEA: Finite Element Analysis.

SDM seamlessly integrates into standardized processes (e.g. A-Spice) in an early development phase

AI-INTEGRATED SYSTEMS ENGINEERING METHODOLOGY



BENEFITS OF SDM INTEGRATION

- Optimized system efficiency and performance by holistic system evaluation in an early stage
- Reduced development time & cost by AI-integration and virtualization
- Advanced control strategies for better system performance by using deep neural network based and model predictive control methodologies
- Multi-dimensional design complexity management by having one single global system optimization loop, balancing KPI trade-offs
- Compliance with regulatory standards by GenAI development guidance and regulation analysis

A comprehensive solution for integrated co-optimized multi-domain design

Get in touch with us for further information

www.fev.com/en/signature-solutions