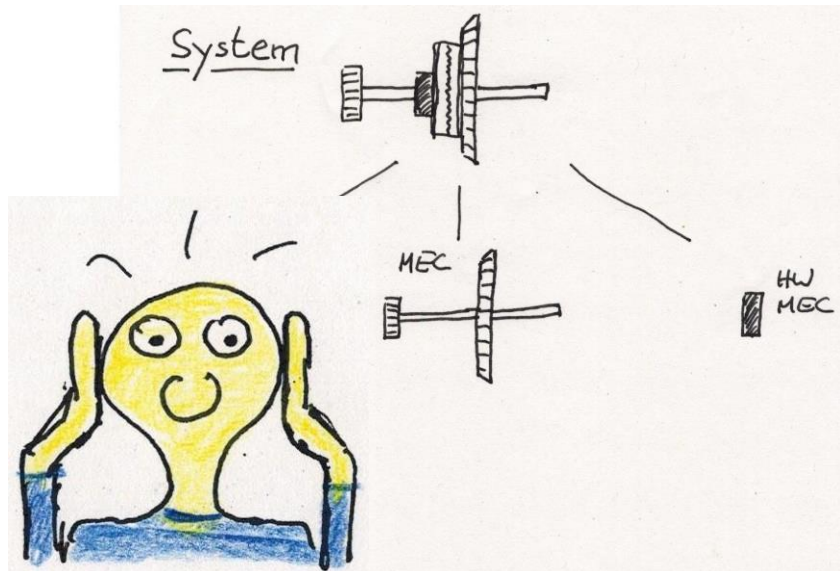


SPIICE for Mechanical Engineering 2.0

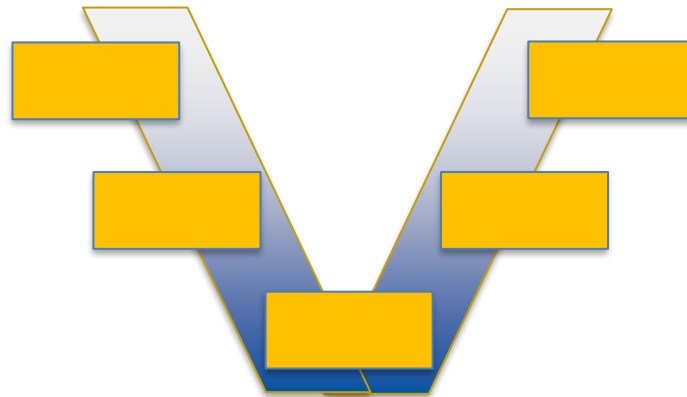


Was Ihre Kunden wirklich erwarten

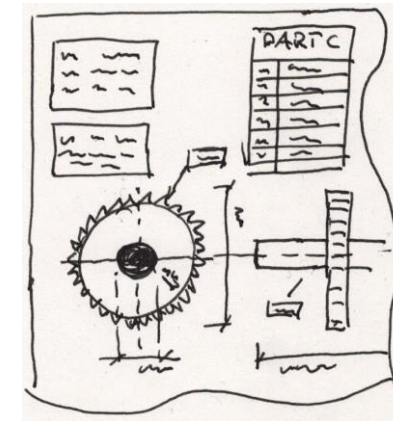
Timo Karasch

Agenda

1. ME-SPICE und Automotive SPICE 4.0

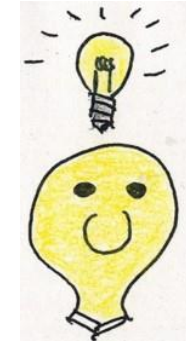


2. Prozesse nach „SPICE for Mechanical Engineering“ 2.0

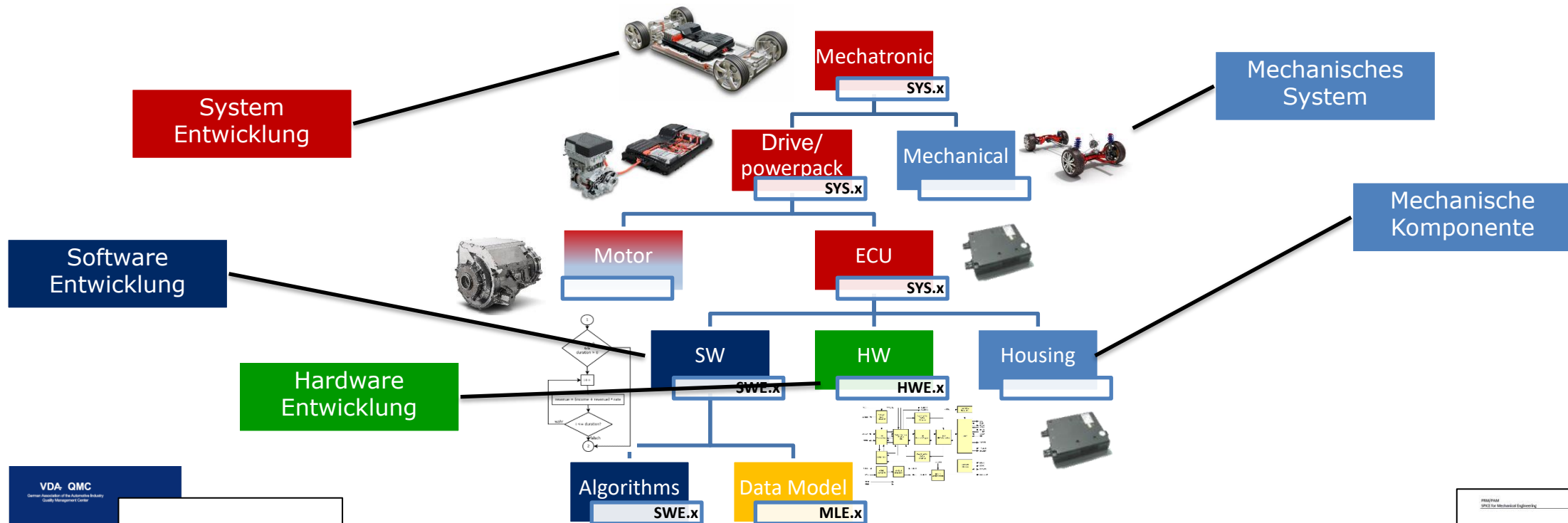


3. Anforderungen und Erwartungen von Kunden

4. Tipps



1. ME-SPICE und Automotive SPICE 4.0



VDA_QMC
German Association of the Automotive Industry
Quality Management Center

Joint Quality Management in the Supply Chain

Automotive SPICE®
Process Reference Model
Process Assessment Model
Version 4.0

Title: Automotive SPICE Process Assessment / Reference Model
Author(s): VDA Working Group 13
Version: 4.0
Date: 2023-11-29
Status: Released

2nd revised edition, November 2023

„Automotive SPICE®“ V4.0

- Veröffentlicht
- Inhalte
 - System Entwicklung
 - Software Entwicklung
 - Hardware Entwicklung
 - Maschine Learning

„SPICE for Mechanical Engineering“ V2.0

- Veröffentlicht
- Inhalte
 - Mechanische System und Komponenten Entwicklung (kombiniert)
- Konsistent mit A-SPICE 4.0

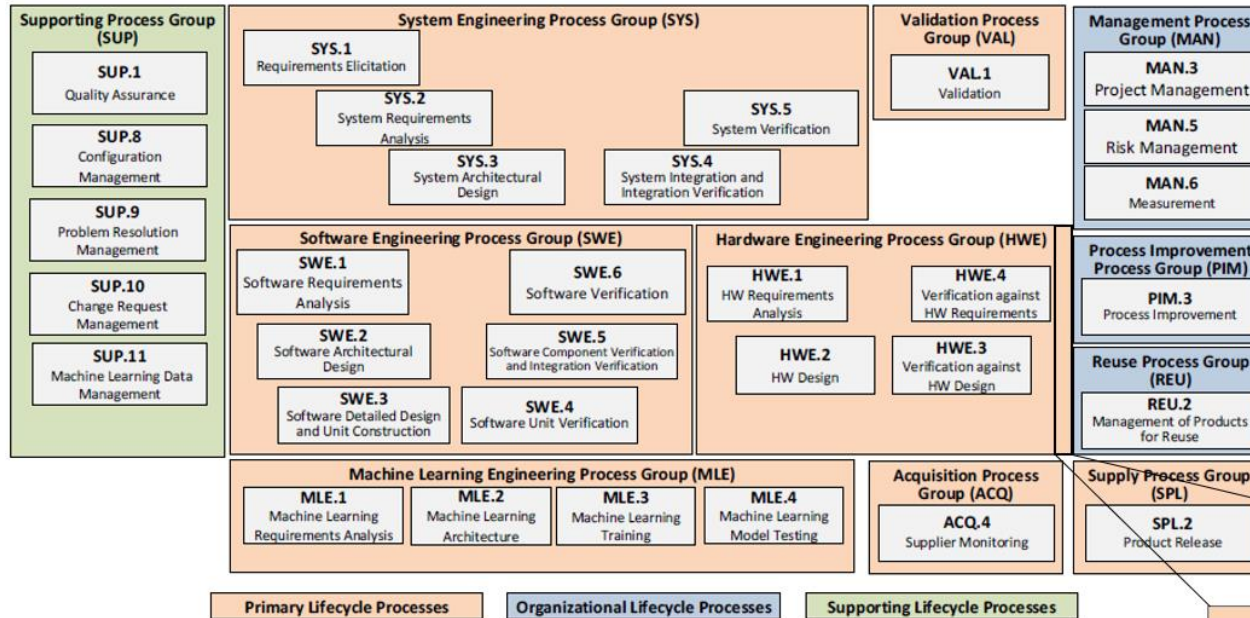
intacs.info

International Assessor Certification Scheme

SPICE
for Mechanical Engineering
Process Reference Model [PRM]
Process Assessment Model [PAM]

Version: 2.0
Release Date: 2024-05-27
Status: Released
Distribution: Public
For the worldwide SPICE community and any other interested parties.

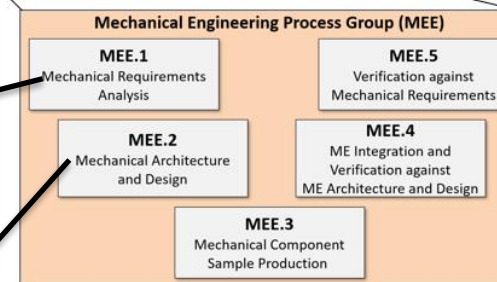
1. „SPICE for Mechanical Engineering“



PAM Mechanical Engineering as Plug-In to ASPICE

Vergleichbar zu SYS.2

Vergleichbar zu SYS.3

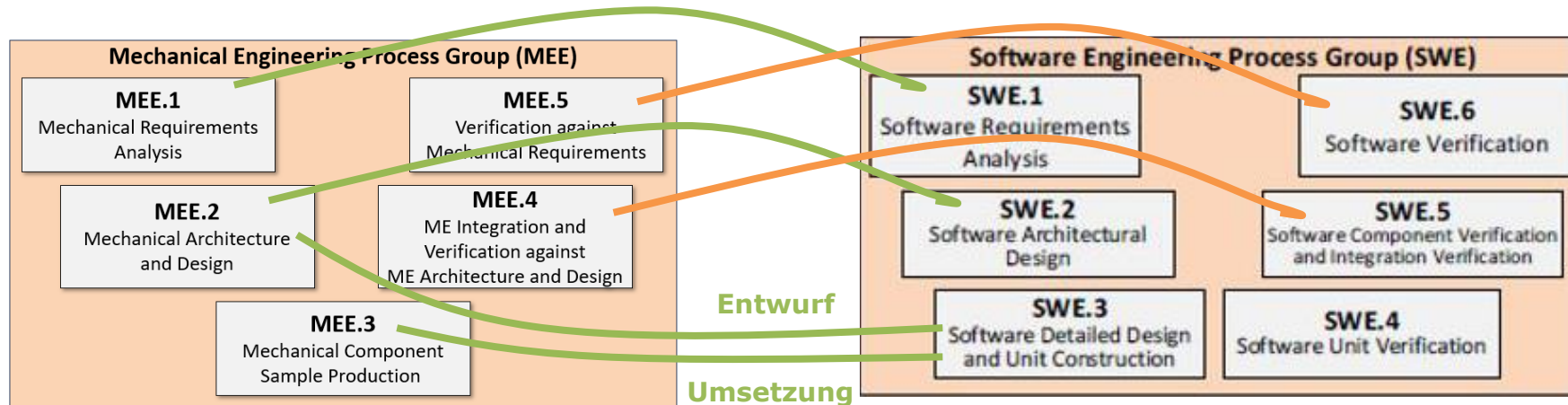


Vergleichbar zu SYS.5

Vergleichbar zu SYS.4

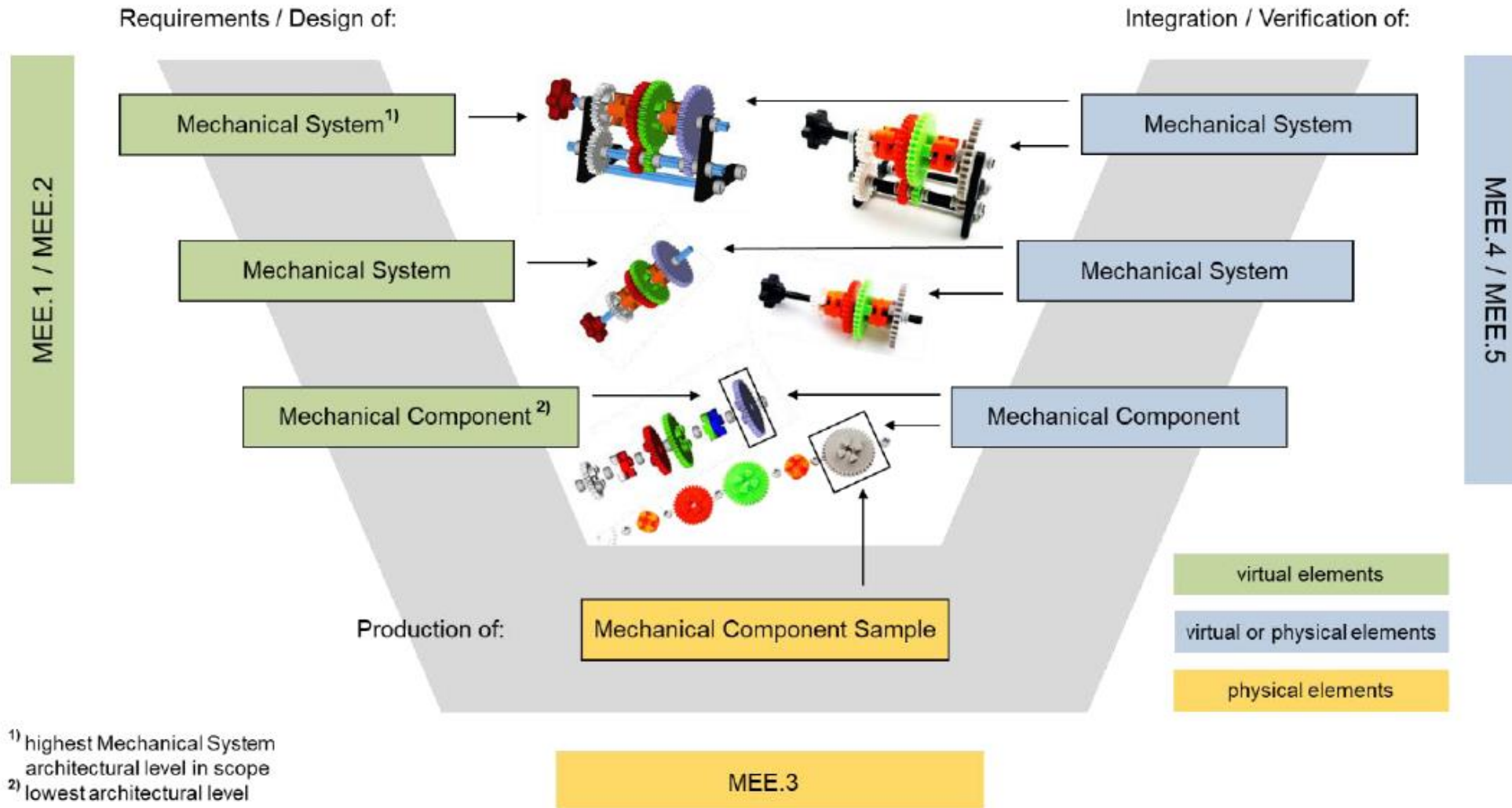
Schnittstelle Zur Produktion

1. Struktur im Vergleich zu SWE



- MEE.1 und MEE.5 sind vergleichbar zu SWE.1 und SWE.6 – Requirements Ebene
- MEE.2 und MEE.4 sind vergleichbar zu SWE.2 and SWE.5 – Architektur Ebene
- SPICE for Mechanical Engineering teilt SWE.3 (Software Detailed Design and Unit Construction) auf:
 - MEE.2 Entwicklungsaktivitäten
 - MEE.3 Physikalische Produktion
- Die Verifikation der Ergebnisse aus MEE.3 (Physikalische Mechanische Komponenten) findet in MEE.4 statt (Gegen das Mechanical Design).
- MEE.3 beschreibt nicht die Serienproduktion, sondern den Support der Musterfertigung.

1. Die Struktur



2. MEE.1 Mechanical Requirements Analysis

The purpose is to transform the mechanic related parts of the defined upper (Mechanical) System Requirements and the upper (Mechanical) System Architecture into Mechanical Requirements that will guide the design of the Mechanical System and the Mechanical Components.



Mechanical System

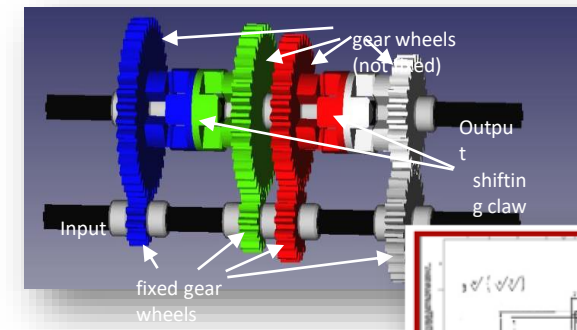


Mechanical Component

- BPs: Die gleiche Struktur, wie "SYS.2 System requirements analysis"
- "Examples for structuring criteria can be grouping, e.g., by functionality or expressing product variants."
- "Prioritization can be done according to project or stakeholder needs via e.g., definition of release scopes (e.g. A-/B-/C-Sample)"

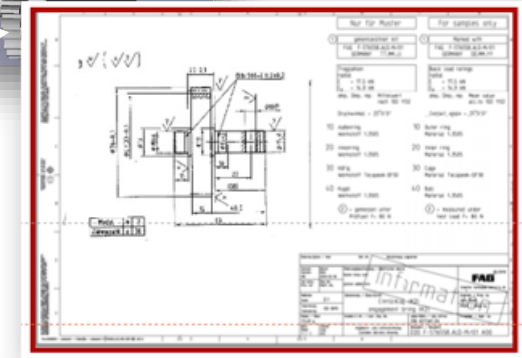
2. MEE.2 Mechanical Architecture and Design

The purpose is to establish a Mechanical System Architecture and Mechanical Component Design, comprising static and dynamic aspects, consistent with the Mechanical System Requirements and Mechanical Component Requirements, and to evaluate the Mechanical System Architecture and Mechanical Component Design against defined criteria.



Mechanical System

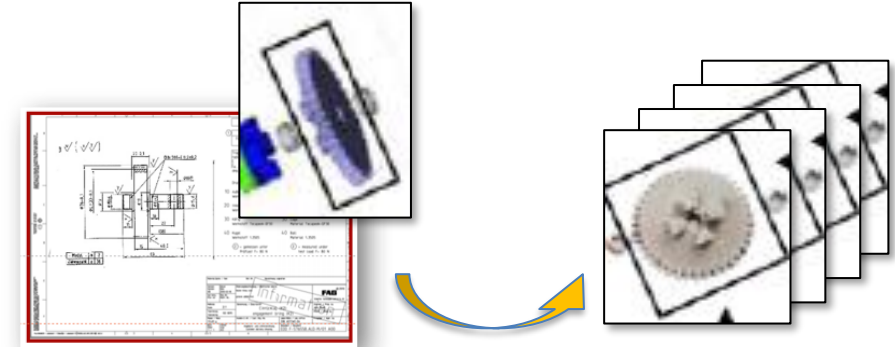
Mechanical Component



- **BP: Beschreibung der statischen und dynamischen Aspekte**
- *"Examples for technical aspects are manufacturability, suitability of pre-existing elements to be reused, or availability of elements"*
- *"Examples of methods suitable for analyzing technical aspects are prototypes, simulations, qualitative analyses. The simulation methods could be FEM, FMEA, CFD"*
- *"The identification of Special Characteristics is supported by e.g., simulation, risk analyses, sizing calculations"*
- **BP: „Consider, determine, and document Design Constraints"**

2. MEE.3 Mechanical Component Sample Production

The purpose is to produce a Mechanical Component Sample that reflects properly the Mechanical Component Design and Mechanical Component Sample Production Specification.



- BP: „Develop Mechanical Component“
- BP: “Agree on Mechanical Component Sample Production Specification”
- BP: “Produce the Mechanical Component Samples (Ensure and support)”

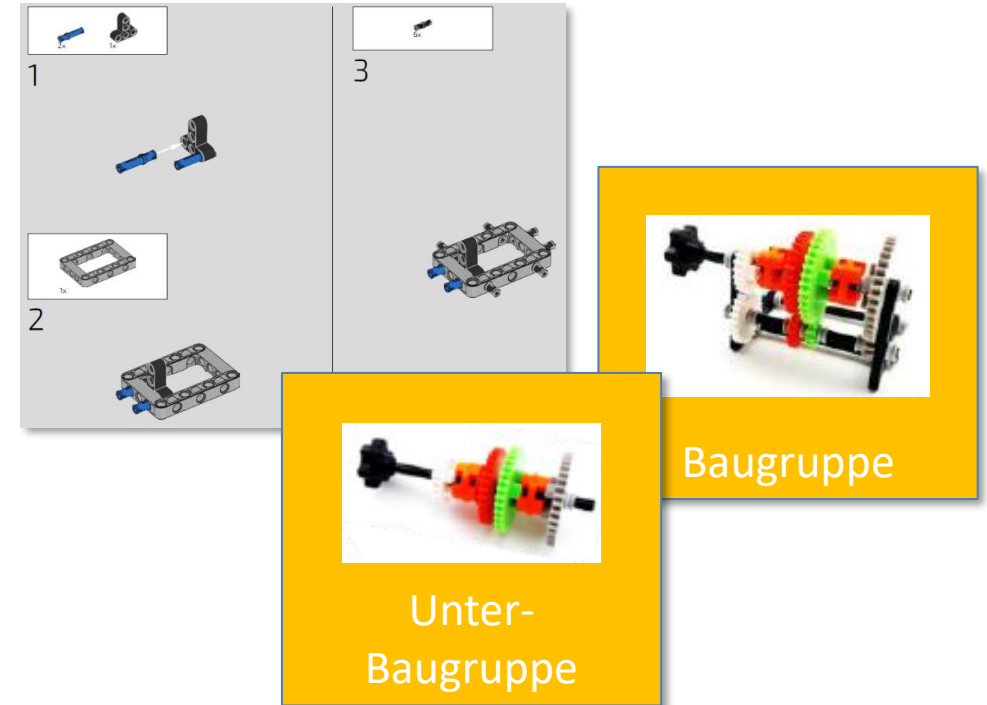


2. MEE.4 Mechanical Integration and Verification against Mechanical Architecture and Design

The purpose is:

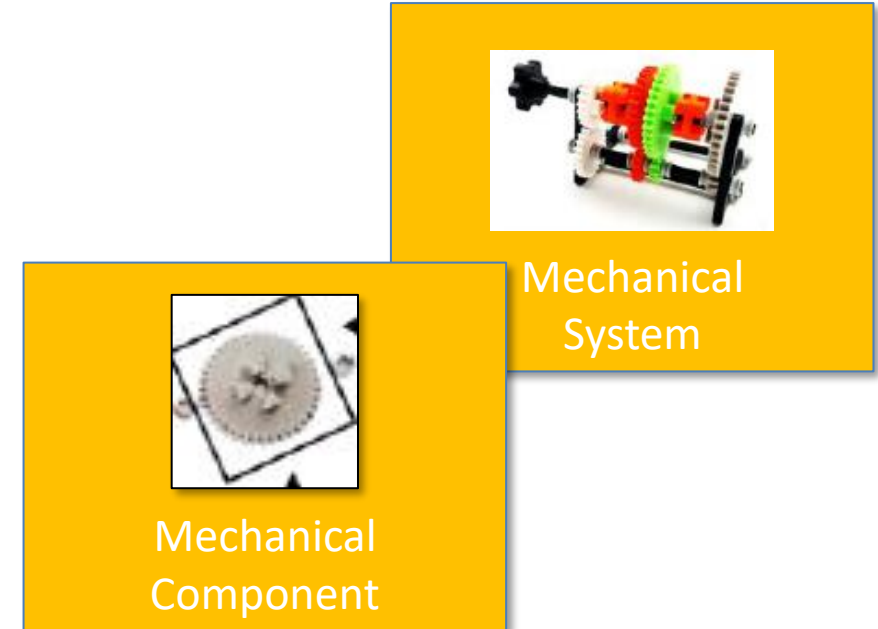
1. to verify the Mechanical Component against the Mechanical Component Design and
2. to ensure the integration of the Mechanical Elements into an integrated Mechanical System consistent with the Mechanical System Architecture and
3. to verify the integrated Mechanical System against the Mechanical System Architecture.

- BP: „Verification Measures“
- BP: „Mechanical Component Design Verification“
- BP: „Define Integration Sequence Instruction“
- BP: “Integrate Mechanical System Elements and perform Mechanical System Integration Verification”



2. MEE.5 Verification against Mechanical Requirements

The purpose is to ensure that the Mechanical Components and the integrated Mechanical System are verified to provide evidence for compliance with the Mechanical System Requirements and Mechanical Component Requirements.



- BP: “Verify the Mechanical Components and integrated Mechanical System”
- “The Verification Measures may cover aspects such as thermal, environmental, robustness/lifetime, etc.”

Anforderungen und Erwartungen von Kunden

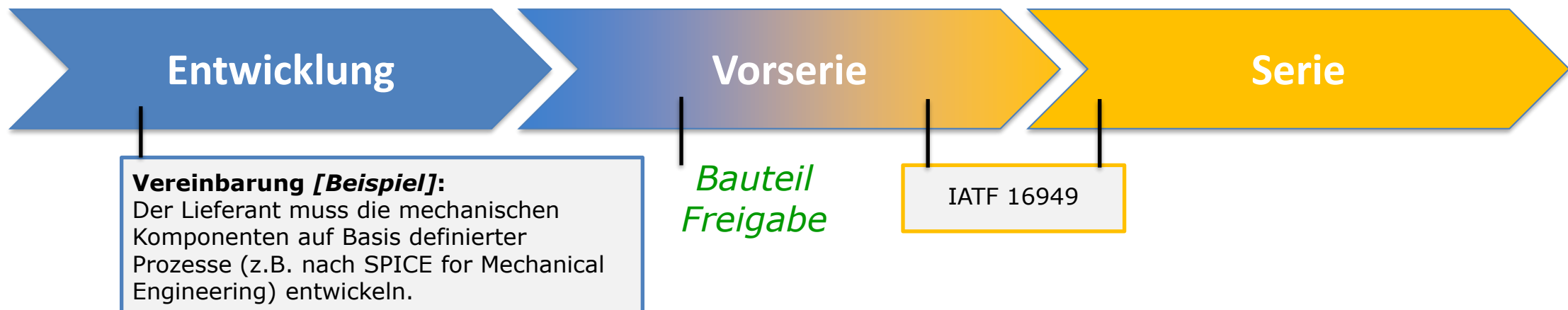
SPICE for Mechanical Engineering shall be applied for:

- Organization or supplier which develops or changes a system or component on basis of the Customer Requirements.
- Organization or supplier which develops a system or component based on "off the shelf" items.

SPICE for Mechanical Engineering is optional to be applied for:

- Organization or supplier which delivers a system or component, which is provided "off the shelf" to the customer.

Aus Kundensicht:



Tipps für den Einsatz von ME-SPICE

Identifikation von Synergien zwischen unterschiedlichen Bereichen

Wissensbewahrung in der mechanischen Entwicklung

Strukturierung der Aktivitäten und Arbeitsergebnisse für das Einphasen neuer Mitarbeiter

Systems **Process Improvement** and **Capability Determination**

Kombination mit IATF 16949

Schnittstellen zur HW im Rahmen der System Entwicklung

Identifikation und Vermeidung systematischer Fehler früh im Projekt





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