

EVO

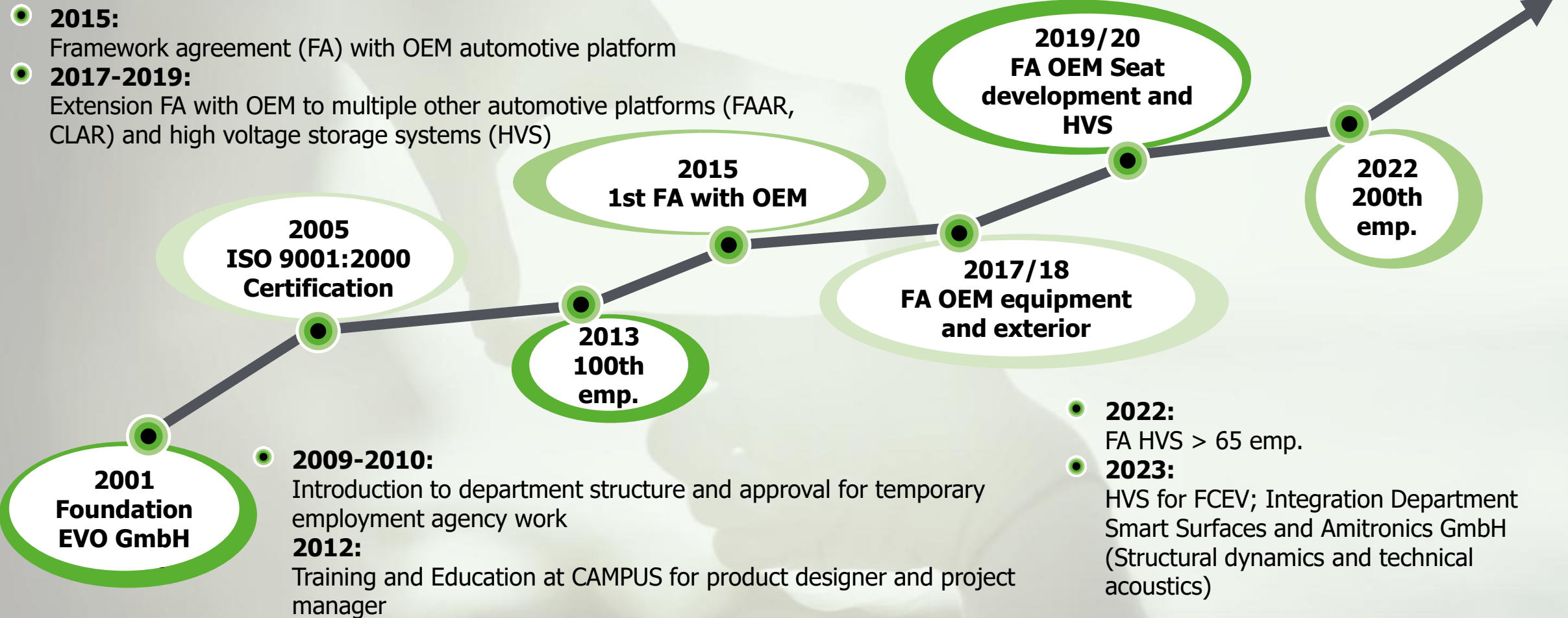
Mobilität
entsteht im
Kopf

COMPANY PRESENTATION EVO GMBH

2024



ISMS-Klassifizierung





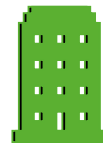
Owner
Managed



250
Employees



23 Years
Experience



3 Locations in
Munich

**A reliable partner to the
automotive industry since 2001**

Certified according to:

- ISO 9001:2015
- CSR 26001:2018
- ISO 27001
- Tisax Level 3.0



Headquarters Oberschleißheim



Project Office Munich



Amitronics GmbH

Toolbox

Standardization e.g.
adapter model
Reduction of variants

Process Know- How

High qualification
level of employees
Management of
interdisciplinary
teams (worldwide)

Taking Responsibility

Reduction of
interfaces
cost optimization
time optimization

Developer Network

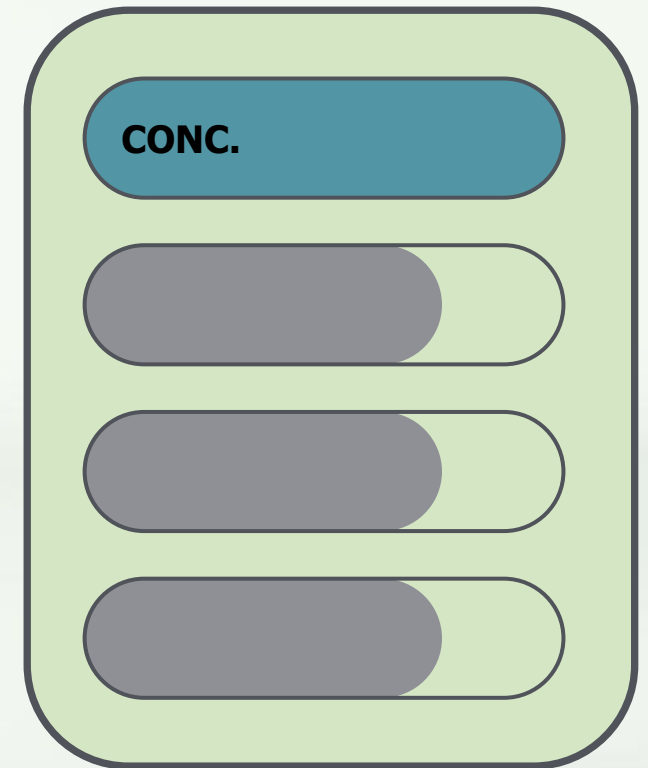
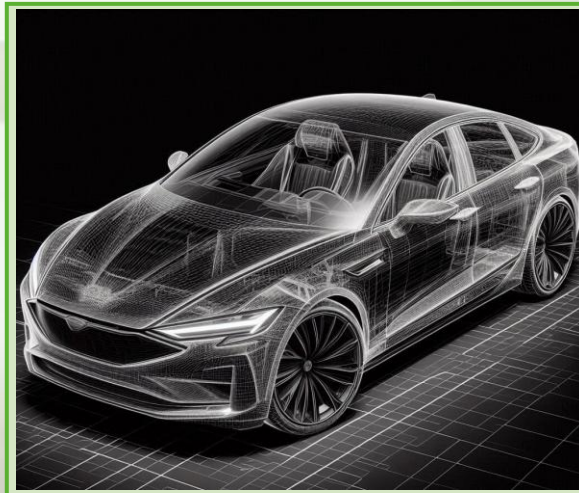
Prototypes
Small series
Series
Trial

STRUCTURE



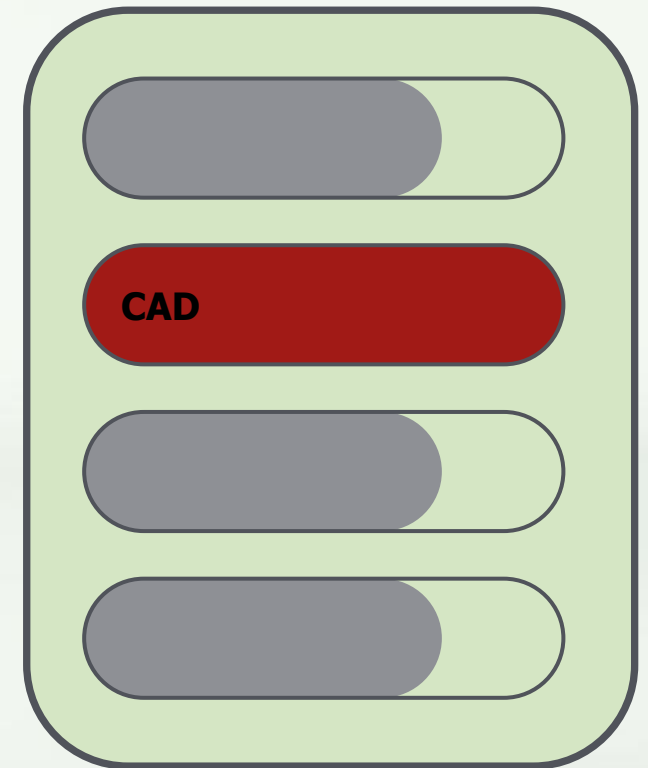
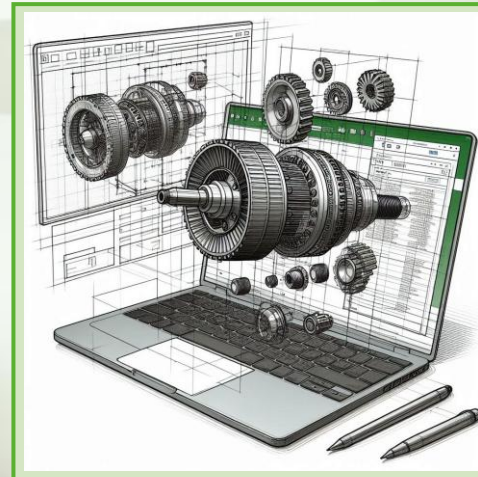
CONCEPT DEVELOPMENT

- Components, assemblies or overall concepts
- Generating ideas for innovative solutions
- Patent research
- Parametric design
- Comparison
- Evaluation (e.g. through simulation)
- Validation
- Benchmarking

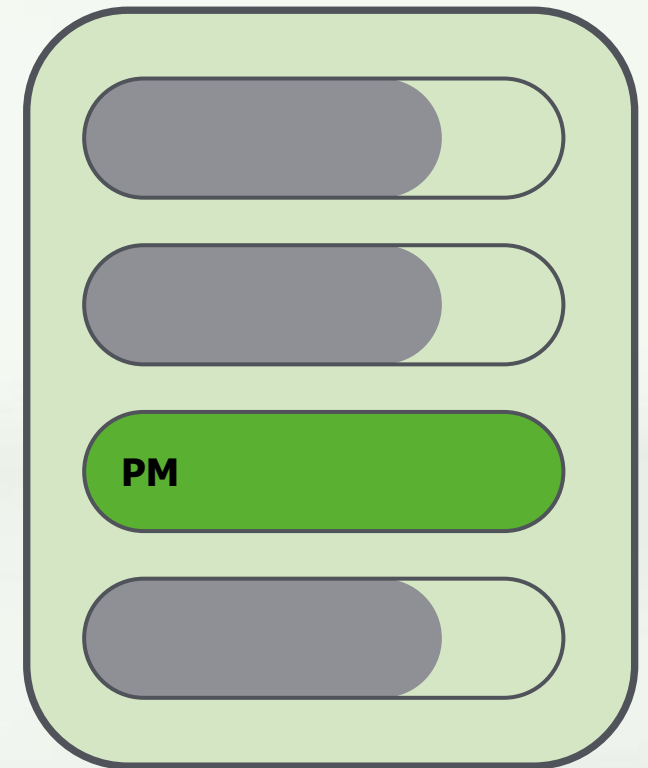


DESIGN

- From push pin to headliner
- Components, assemblies or overall development of vehicle modules
- Overall development until start of series production
- Creation of design specifications & stress assessment
- Customer-specific release preparations
- Creation of basic data (envelope curves, interfaces,...)
- Design and drawing creation in Catia
- Materials:
 - Metal
 - Plastics
 - Textiles
 - Foam
 - Smart Materials

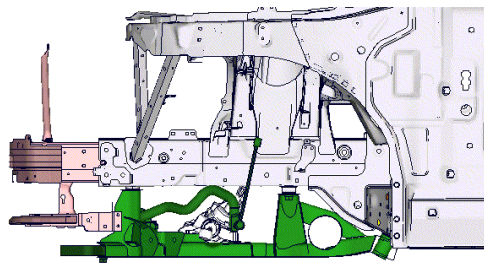


PROJECT MANAGEMENT

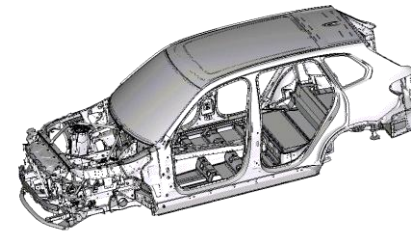


SIMULATION

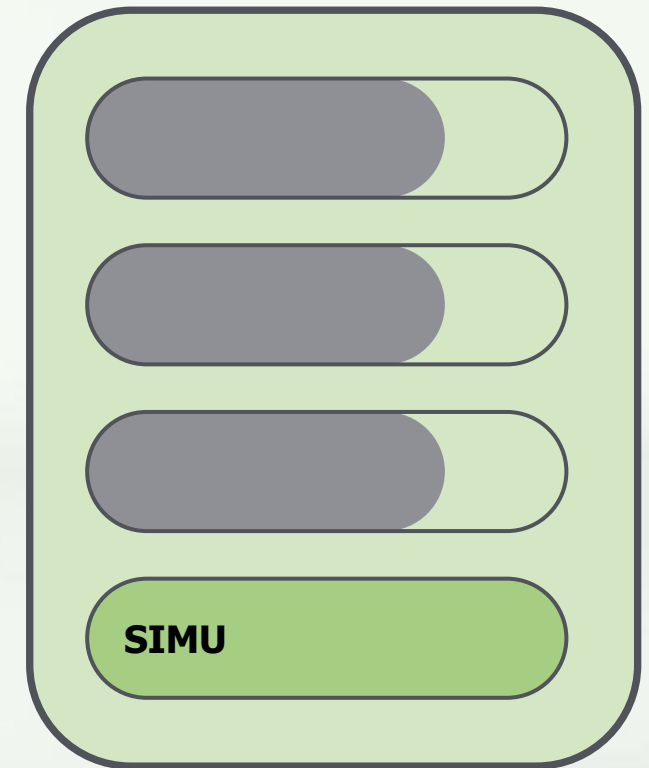
- close collaboration with concept and CAD developers
- Data provision
- Development/creation of modeling catalog (MoKa)
- Stiffness/strength simulation (non-linear)
- Scripting and automation
- Method development
- whole vehicle simulation (front, rear and side crash)
- Module-specific simulations
- Simulation results comparison with hardware test results
- Modules
 - Seat
 - Door
 - Structure
 - HVS
 - Trims part



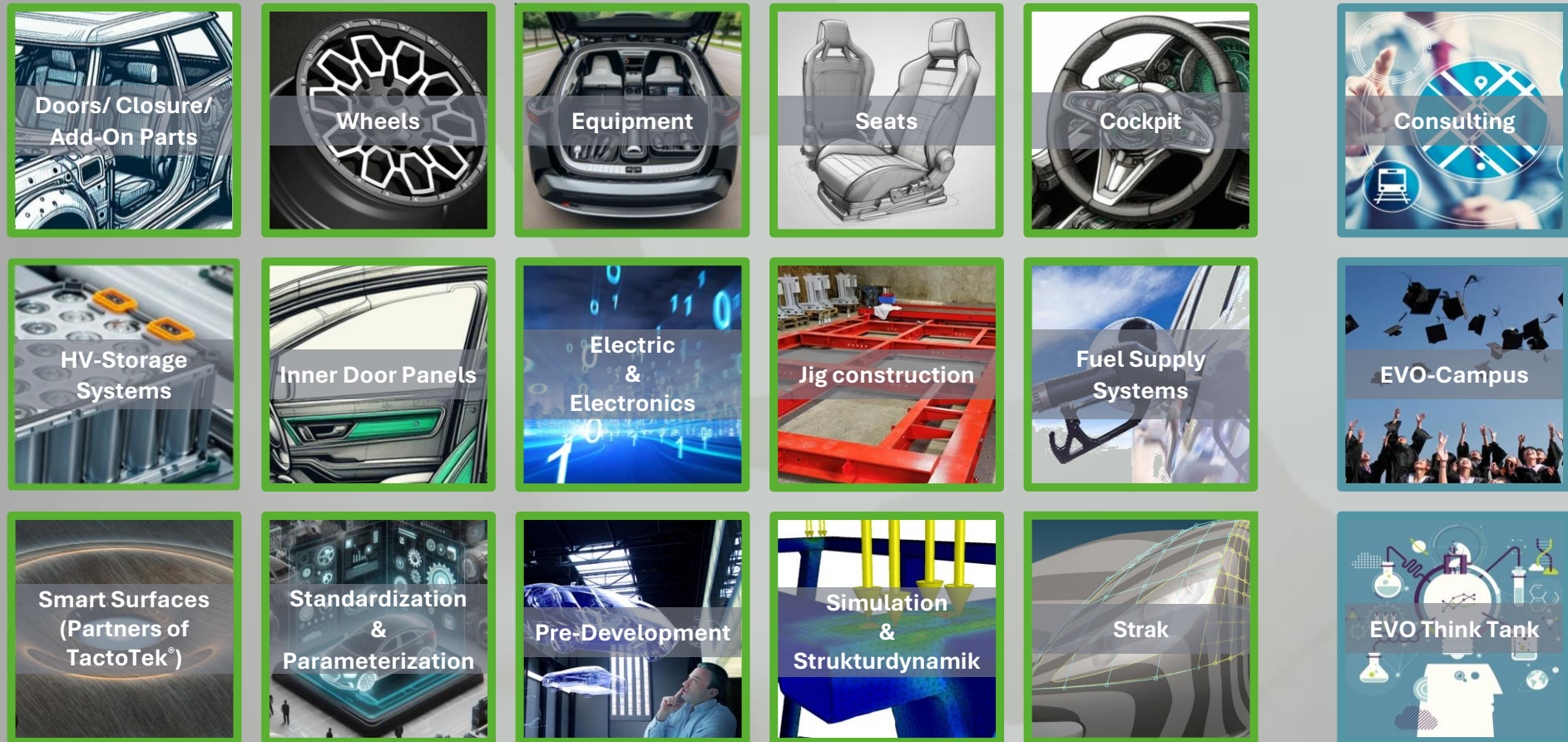
Front Crash Simulation



Natural Frequency Analysis



SERVICES OFFERED



Angewandte Mikromechanik GmbH
AMITRONICS

Group Doors/ Closure/ Add-On Parts

OVERVIEW

DEPARTMENT 1

GROUP DOORS/ CLOSURE/ ADD-ON PARTS

- Jig construction
- Smart Surfaces
- Standardization / Parameterization

GROUP COCKPIT / DOOR INNER PANEL

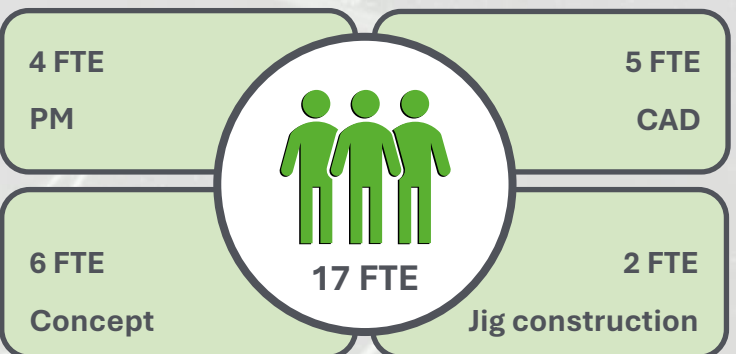
GROUP STRAK

GROUP EQUIPMENT



Markus Spitzhorn

Group Leader Doors/ Closure/ Add-On Parts



Group Doors/ Closure/ Add-On Parts

SERVICES: DOORS/ CLOSURE/ ADD-ON PARTS

Focus Areas

- Components:
 - Door structure, sealing system
 - Panels, trim strips
 - Full sill cover
 - Cladding, wheel arch liners
 - Bumpers, underbody panels
 - Side panels, LKS
- Extras:
 - Package – Development

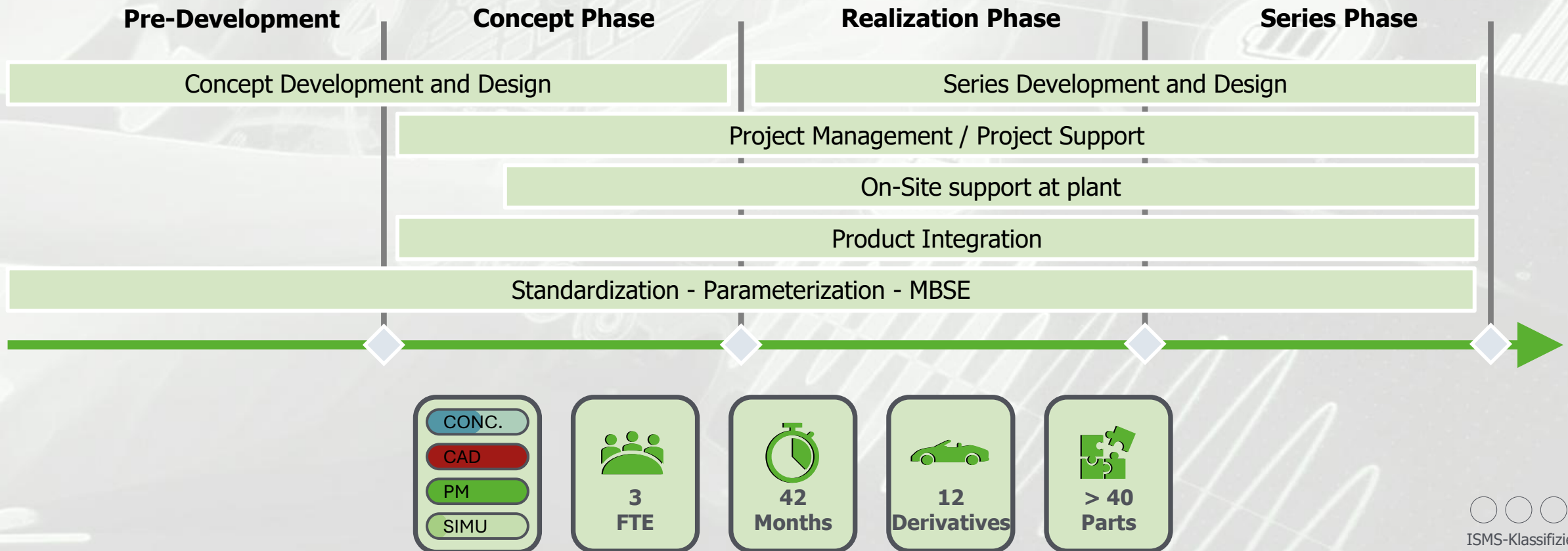
References

- New exterior handles
- Lightweight carrier
- Exterior illumination
- Overall door concept – Creations
- BMW Serie 3, X Derivatives
- BMW FAAR WE Series 2 Active Tour, X2, X1, Series 1, Series 2 Gran Coupé
- M GmbH M3, M4, G8x (UBV)
- Co. Langer LKS Series 3

Group Doors/ Closure/ Add-On Parts

PROJECT EXAMPLE: SUPPORT 1ST TIER

- Support for existing and new 1st tier OEMs
- e.g. resident for the tailgate area



Group Doors/ Closure/ Add-On Parts

SERVICES – JIG CONSTRUCTION + SMART SURFACES

Focus Areas Jig construction

- Identifying solutions
- Conception of jigs and fixtures
- Project management (customer and supplier)
- CE declaration of conformity - risk assessment with partners

Focus Areas Smart Surfaces

- Surfaces with integrated light and specific functions
- Representation in 3D surfaces
- Minimum radii of 3mm can be realized, including conductor tracks
- Small package up to 4mm
- Small number of components

References Jig construction

- Siemens
 - Welding fixtures
 - Clamping fixtures
 - Clamping fixtures for floor assembly production
- Amitronics
 - Support bracket Vibration test for ignition coils

References Smart Surfaces

- BMW
 - Doors department
 - Door Panel department

Group Doors/ Closure/ Add-On Parts

SERVICES – STANDARDIZATION / PARAMETERIZATION

Focus Areas

- Establishment and further development of Catia tools:
 - Analysis of current development processes
 - Creation of routines and dependencies automation
 - **meshing** and Modelling of a model set
 - Checking and Validation of specifications and guidelines
 - Model technology - model structure & language
- Further support, service and assistance
- Offer: Workshop series in the entire development area

References

- BMW
 - Doors department
 - Side frames department
 - Door Panel department
 - Equipment department
 - Workshop series in the entire development department

Group Doors/ Closure/ Add-On Parts

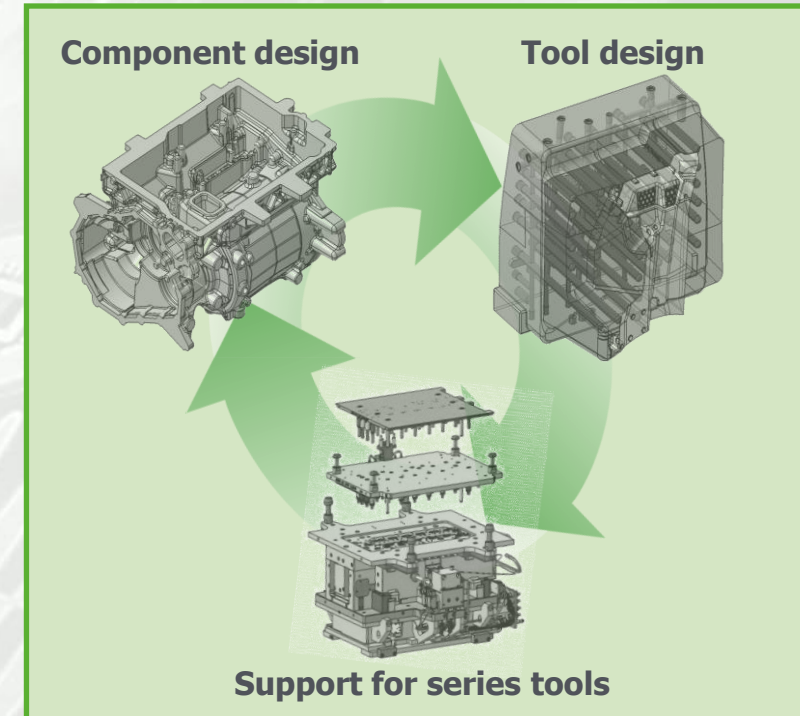
SERVICES – CASTING TECHNOLOGY

Focus Areas

- Component design
- Development of the tool design
- Support for series tools
- Casting technologies:
 - Low pressure
 - Gravity
 - Die casting
 - Injection
 - Lost foa
 - Core box construction

References

- BMW Landshut framework agreement

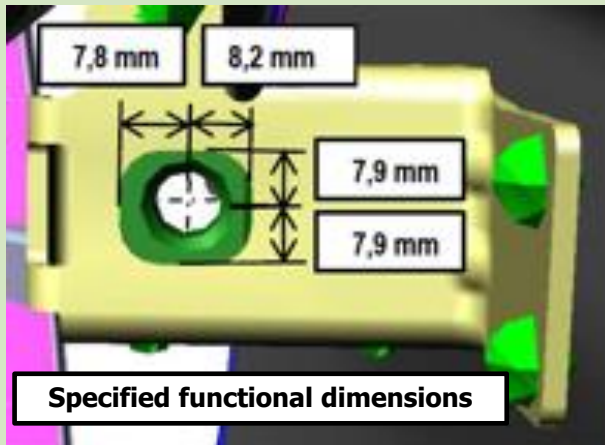


Group Doors/ Closure/ Add-On Parts

PROJECT EXAMPLE: STANDARDIZATION / PARAMETERIZATION

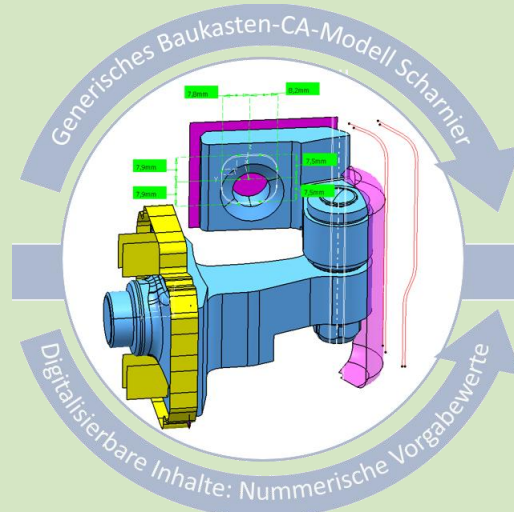
Input

- Design specifications
- Legal requirements
- Standards
- Installation space specifications
- Dimensional specifications
- Geometric dependencies
- Interfaces



Process

- Package
- Cutaway models
- Functional validation
- Concept investigations
- Strak evaluations
- Corresponding overall vehicle sections



Output

- Design specifications
- Standardized cutaway models
- Released design data
- Interactive models
- Checked specifications
- 3D representation of all relevant components, which are adapted to the specific derivative.

Derivative A



Derivative B



Derivative C



Group Cockpit / Door Inner Panel

OVERVIEW

DEPARTMENT 1

GROUP
DOORS/ CLOSURE/ ADD-ON PARTS

GROUP
COCKPIT / DOOR INNER PANEL

GROUP
STRAK

GROUP
EQUIPMENT



Rainer Fink

Group Leader Cockpit / Door Inner Panel



Alexander Pölt

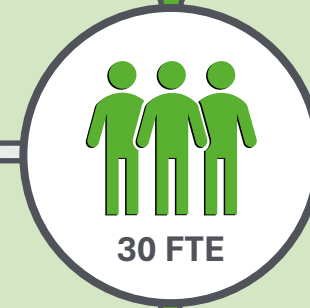
Group Leader Cockpit / Door Inner Panel

11 FTE
PM

9 FTE
CAD

4 FTE
Concept

6 FTE
CAD BCC



Group Cockpit / Door Inner Panel

SERVICES: COCKPIT

Focus Areas

- Components:
 - electronic components
 - Integration of driver assistance systems
 - Safety components / airbag
- Technical design and overall conception
- Creation of joint plans and Functional Dimensions Concept
- Material definitions and pairings
- Head impact tests in accordance with ECE and FMVSS using CAVA

References

- Series development including E/E packages, M packages (MSP)
- Concept/series development BMW 5 Series, 7 Series, X3 (ICE successor)
- NCar XNF development teams (administrative and technical concept)

Group Cockpit / Door Inner Panel

SERVICES DOOR INNER PANEL

Focus Areas

- Concept, component, pre-series and series development
- Components:
 - Mechanical and electrical actuators
 - Functional and decorative parts (Smart Surfaces)
 - Ambient lighting
- Generation, support and Management of Functional Dimensions Concept
- Customer-specific digitization and implementation in database systems
- VIP digitization partner BMW

References

- Series development including E/E packages, M packages (MSP)
- Concept/series development BMW 5 Series, 7 Series, X3 (ICE successor)
- NCar XNF development teams (administrative and technical concept)

Group Cockpit / Door Inner Panel

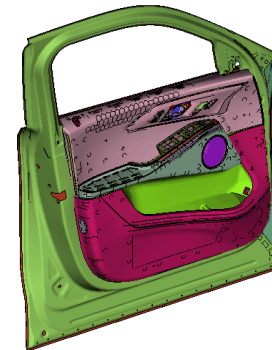
SERVICES COCKPIT / DOOR INNER PANEL

Simulation

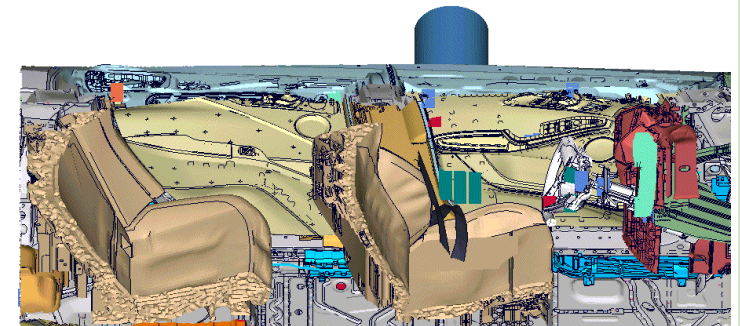
- Stiffness and Rigidity -Simulation (not linear)
- Whole vehicle Simulation (Front , Heck and Side Crash)
- Corridor Simulation (Stiffness / Dynamic)
- Misuse Simulation
- compressive strength simulation (door seal)
- Airbag-Integration
- Modal Analysis
- Door Slam Simulation
- head impact

References

- Series development incl. E/E scopes, M scopes (MSP)
- Concept/series development BMW 5 Series, 7 Series, X3 (ICE successor)
- NCar XNF development teams (administrative and technical concept)



natural frequency analysis

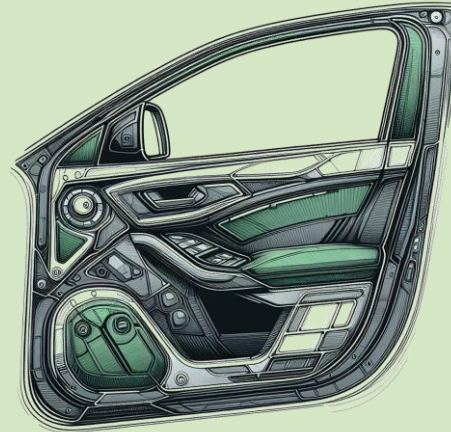


Side-Crash Simulation

Group Cockpit / Door Inner Panel

PROJECT EXAMPLE: FROM CONCEPT STUDY TO START OF SERIES PRODUCTION

- Integration of new concepts for the emergency release function for electrical actuations
- Development door inner panels
 - Carcass
 - Electrics
- Processing of requests:
 - Design
 - Ergonomics
 - Crash
- Support with prototyping



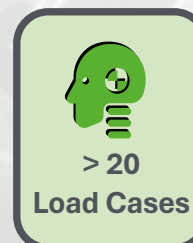
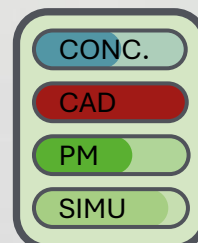
Concept Phase

- First concepts
- Simulations
- Material analysis



Series Phase

- Development of series components
- Sample assemblies / validation
- Factory start-up phase



DEPARTMENT 1

GROUP
DOORS/ CLOSURE/ ADD-ON PARTS

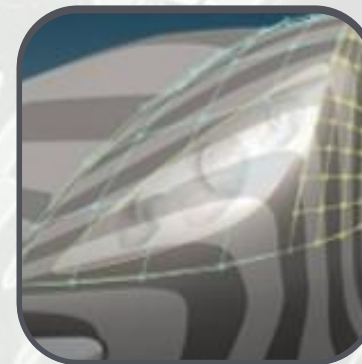
GROUP
COCKPIT / DOOR INNER PANEL

GROUP
STRAK

GROUP
EQUIPMENT



Rainer Fink
Group Leader Strak



1 FTE
PM

2 FTE
CAD

1 FTE
Concept



4 FTE

SERVICES

Focus Areas

- Interior and exterior surface design
- Complete range of fairings, cockpit, seat bench for motorcycles and scooters
- Form-finding using CAS data generation
- industrialized design target image using Strak
- From concept Strak to class A Strak
- Supervision or management of the design-technology convergence process

References

- Exterior:
 - Lights front and rear Co. Mini
 - Motorsport spoiler and add-on parts
- Interior:
 - Rolls Royce Ghost NF
 - Various M vehicles
- Cross-derivative modular steering wheels
- Various controls in center consoles, headliner, door trim and steering wheel
- Mini and Rolls Royce radio key



SERVICES

Procedure

- Short communication channels between the groups
- From a single source:
 - Technical-functional expertise
 - Design expertise
 - Feasibility studies
 - Corresponding calculation option
- Close integration of technology, strategy and simulation
- Reduction of interfaces and meetings
 - Time and cost savings
 - Reduced workload for the coordination committees



Group Equipment

OVERVIEW

DEPARTMENT 1

GROUP
DOORS/ CLOSURE/ ADD-ON PARTS

GROUP
COCKPIT / DOOR INNER PANEL

GROUP
STRAK

GROUP
EQUIPMENT

- Acoustics
- HVS housing



Bernd Palofcsik
Group Leader Equipment



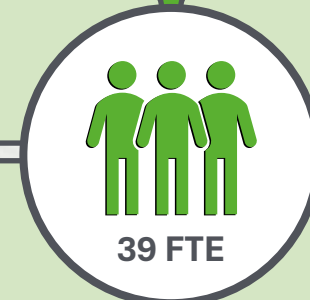
Peter Riedenauer
Group Leader Equipment

8 FTE
PM

23 FTE
CAD

3 FTE
Concept

5 FTE
CAD BCC



Group Equipment

SERVICES

Focus Areas

- Components:
 - Luggage compartment
 - Greenhouse with headliner
 - Interior fittings
 - Center console
- According to design specifications & Strak assessment
- Materials:
 - Plastics
 - Metals
 - Textiles
- Assembly simulation

References

- BMW NCAR, XNF
- Greiner
- Holz Wastl
- Ineos Grenadier
- Hörauf & Kohler



Group Equipment

SERVICES

Simulation

- Stiffness/strength simulation (non-linear)
- Static weight load Simulation
- Dynamic ball dropping /ball rolling
- heat deflection resistance (Simulation)
- Corridor Simulation (Dynamic Stiffness)

References

- BMW NCAR, XNF
- Greiner
- Holz Wastl
- Ineos Grenadier
- Hörauf & Kohler



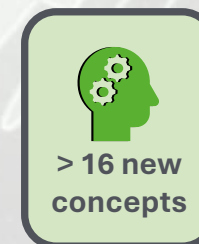
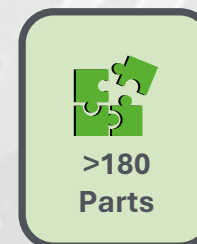
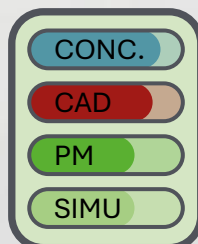
Group Equipment

PROJECT EXAMPLE: DEVELOPMENTS FOR HIGH-VOLTAGE STORAGE SYSTEMS

- Development of various concepts for housings, fluid routing, degassing and structural components
- From concept to SOP
- Analysis of air and creepage distances
- Coordination of OEM, assembly plant, Tier1 and Tier2
- Release and change management



High-voltage storage system



Group Seats

OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

GROUP
E/E

GROUP
WHEELS

GROUP
HVS E/E

GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Steffen Müller
Group Leader Seats

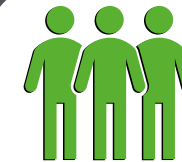


19 FTE
PM

19 FTE
CAD

4 FTE
Concept

3 FTE
CAD BCC



45 FTE

Group Seats

SERVICES

Focus Areas

- Components:
 - Seat structure, kinematics
 - Foam, cover
 - Headrests, center armrest
 - Seat trims
 - Airbags, seat belts
 - Heating and air conditioning systems
 - Comfort systems
- Materials
 - Plastics
 - Metals
 - Textiles

References

- Concepts: Reclining seat, folding seat, 3D kinematic seat, swivel seat, headrests
- BMW 3 Series, 5 Series, 7 Series, X3, X5, X6, X7, 8 Series, Z4 Ineos Grenadier
- Jaguar
- Rolls Royce



Group Seats

SERVICES

Simulation

- Head impact
- SAB/FSAB-airbag deployment
- Seats Pendulum simulation (ECE-R17/R21)
- Head rest Pendulum Simulation
- Frontal impact (Submarining)
- 20g-acceleration simulation
- Backrest moment test
- Static headrest test
- Headrest connection stiffness

References

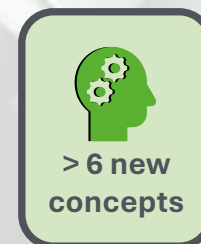
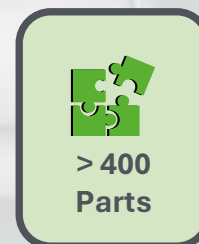
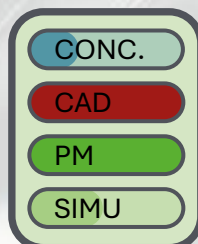
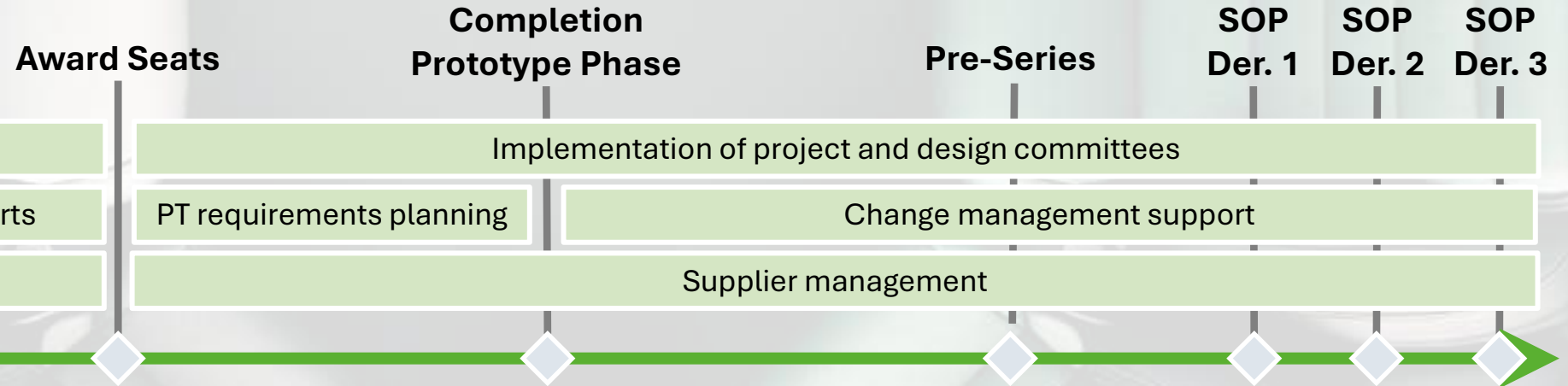
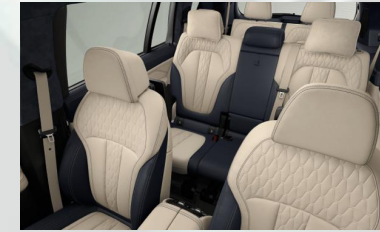
- Concepts: Reclining seat, folding seat, 3D kinematic seat, swivel seat, headrests
- BMW 3 Series, 5 Series, 7 Series, X3, X5, X6, X7, 8 Series, Z4 Ineos Grenadier
- Jaguar
- Rolls Royce



Group Seats

PROJECT EXAMPLE: COMPLETE SEAT DEVELOPMENT FOR VARIOUS DERIVATIVES

- Multiple vehicle derivatives X-series
 - 5-seater, 5-seater Chinese market, 6-seater, 7-seater
- Armrests and headrests with integrated additional functionality



Group Pre-Development

OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

GROUP
E/E

GROUP
WHEELS

GROUP
ENERGY STORAGE SYSTEM E/E

GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Steffen Müller

Group Leader Pre-Development



Group Pre-Development

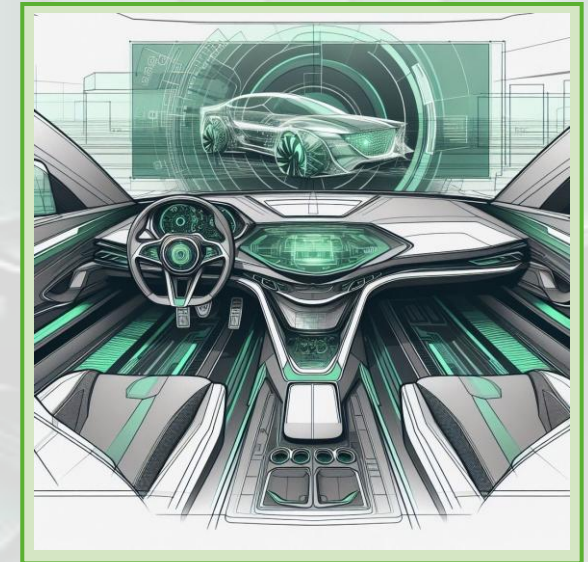
SERVICES

Focus Areas

- Cross-thematic pre-development projects
- Wide range of product developments
- Materials:
 - Metals
 - Plastics
 - Textiles
 - Foam
- B2C and B2B products

References

- Reclining seat, folding seat, 3D kinematic seat, swivel seat, headrests
- Peripherals for outboard and inboard engines



Group Pre-Development

PROJECT EXAMPLE: FUTURE-PROOF SEAT AND STRUCTURAL DEVELOPMENT

Our role: System developer

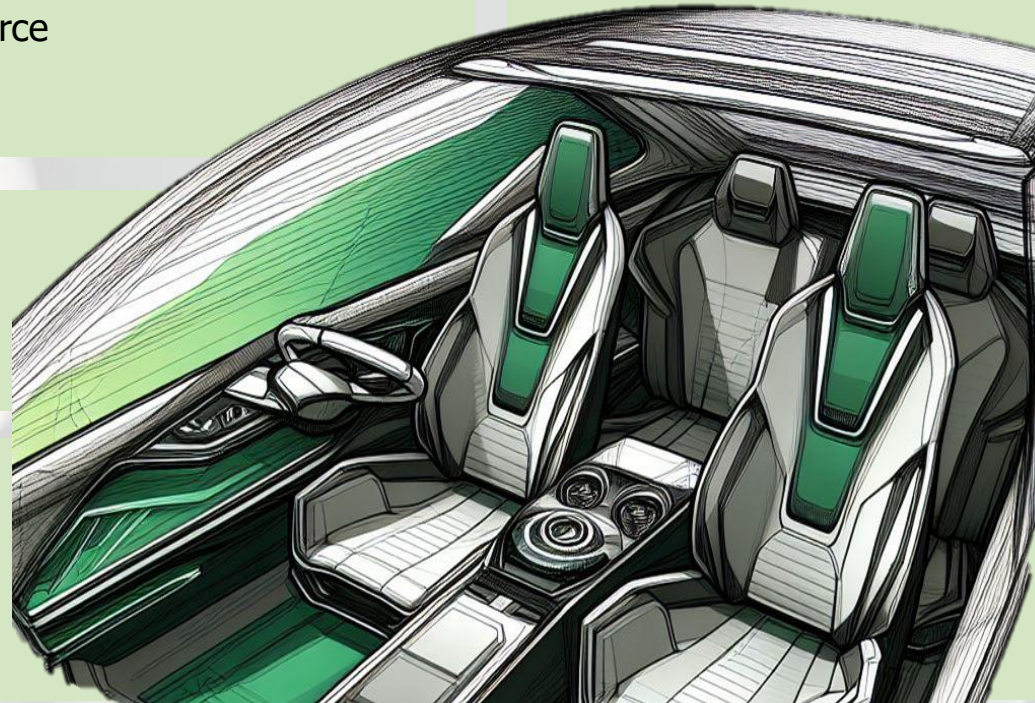
- Design and simulation from a single source
- Comfort and function

Our approach: in-house development

- Maximum flexibility
- Development and testing of various concept approaches

Our vision: future-proofed

- Preparing for change in the 21st century
- Independent benchmarks



Kinematized center of masses

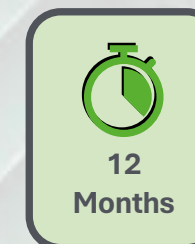
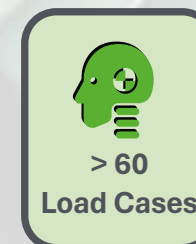
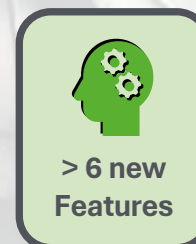
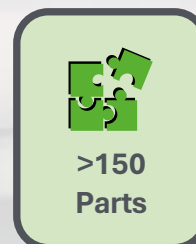
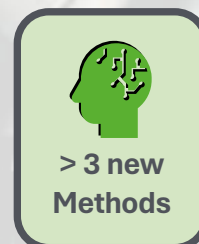
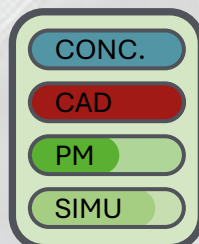
- All Seating Positions
- Stable Input for FEA

CATIA Design

- Prepared for FEA Simulation
- Fully parameterized

Foam parametrics

- Partially Automated
- Integrated comfort



OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

GROUP
E/E

GROUP
WHEELS

GROUP
ENERGY STORAGE SYSTEM E/E

GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Hermann Engl

Group Leader Electrics/Electronics

6 FTE
PM

3 FTE
CAD

3 FTE
Concept

3 FTE
CAD BCC



15 FTE

SERVICES

Focus Areas

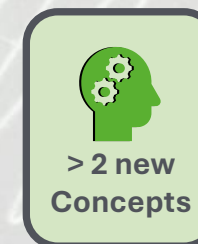
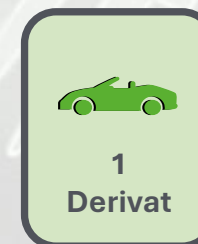
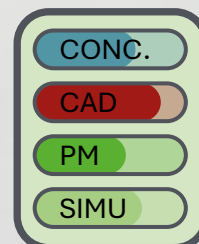
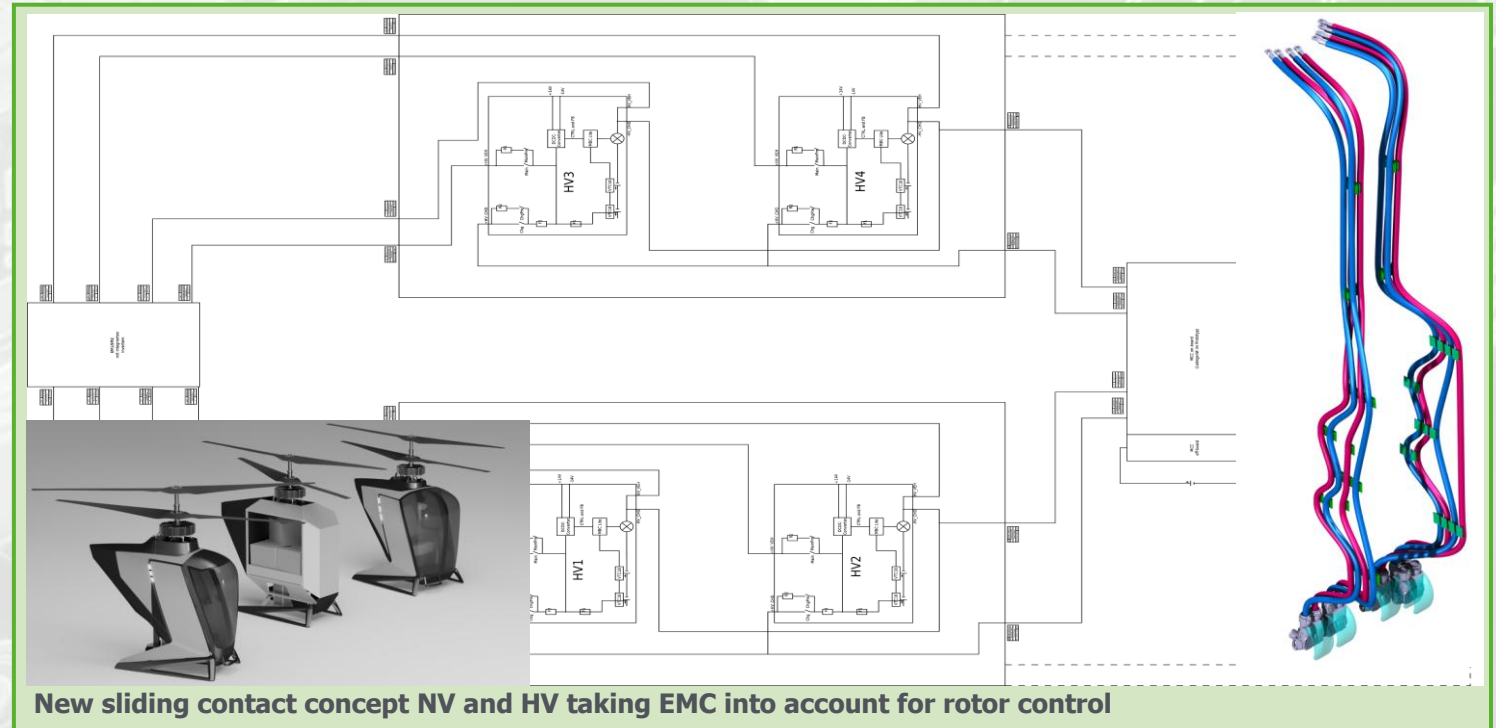
- E/E configuration of the entire vehicle
- Wiring system development
- Integration of E/E components into an overall concept
- MBSE (Model Based Systems Engineering)
 - AI DataTronic Analytics
- Design of cooling concepts
 - Energy storage system
 - Powertrain (combustion engine, electric, H2)
- Digital twin
- Various energy storage system types

References

- Digital twin for cooling concept axial flux motor with cryogenic H2
- High-voltage and low-voltage electrical system for a drone manufacturer
- High-voltage storage for an FCEV
- DC/DC converter for an FCEV

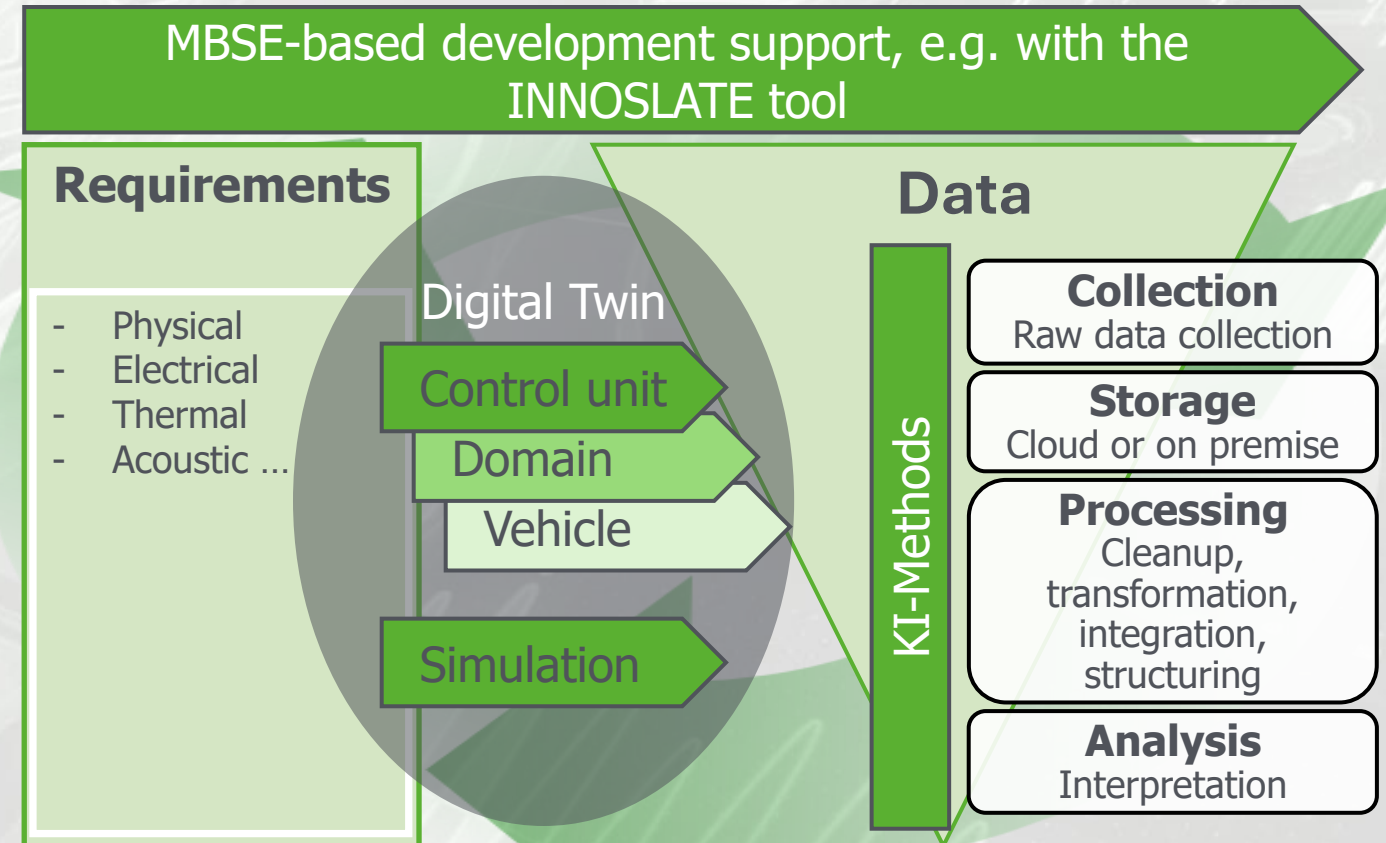
PROJECT EXAMPLE: WIRING SYSTEM DEVELOPMENT FOR AUTOMATED FLYING CARGOCOPTERS AND AIR CABS

- Process consulting for requirements and configuration management for the entire aircraft
- Requirements management
 - Wiring system configuration - high-voltage/low-voltage
 - Simulation and design of current carrying capacity
- Cable harness development
- Development of power distributor
- Process consulting industrialization
- Implementation of industrialization of wiring systems



PROJECT EXAMPLE: AI DATATRONIC ANALYTICS

- MBSE-based development support
 - e.g. based on INNOSLATE program
- Machine learning and AI methods
- Signal analysis in the field of technical acoustics
- Automated evaluations and comparisons of simulation and test results
- Development of special software, e.g. for process and interface automation



Group Wheels

OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

GROUP
E/E

GROUP
WHEELS

GROUP
ENERGY STORAGE SYSTEM E/E

GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Norbert Blechl
Group Leader Wheels



4 FTE
PM

1 FTE
CAD



5 FTE

Group Wheels

SERVICES

Focus Areas

- Optimization of weight and aerodynamics
- Integration of inserts (e.g. plastic, metal)
- Special and special topics relating to wheels, e.g. active aerodynamics
- Technological leap in turbo die casting
- Carrying out all simulations (including small overlap)
- Acoustic measurements and road tests

References

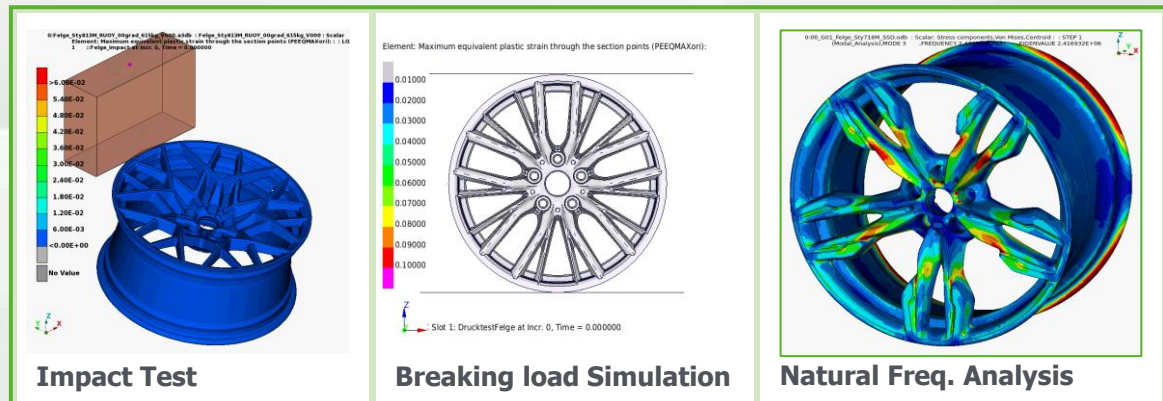
- BMW M wheels, MINI wheels
- Porsche wheels for Otto Fuchs and SAI
- AMG feasibility study active aero wheel
- Aftermarket wheel for Ronal, Minda Kosei
- Prototype wheels for Piech
- Wheels developed in-house (patented)

Simulation

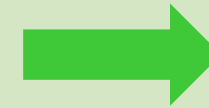
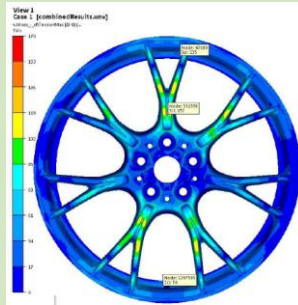
- Natural Frequency analysis
- Impact Test (axial)
- Cornering (rotary) fatigue
- Radial fatigue
- Breaking load (Small Overlap)
- Stress analysis
- Hub stiffness

References

- BMW M wheels, MINI wheels
- Porsche wheels for Otto Fuchs and SAI
- AMG feasibility study active aero wheel
- Aftermarket wheel for Ronal, Minda Kosei
- Prototype wheels for Piech
- Wheels developed in-house (patented)



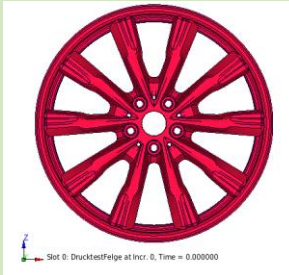
FROM THE DESIGN SKETCH TO THE MARKET-READY WHEEL



SMALL OVERLAP SIMULATION



Before optimization



After optimization



Real-life experiment

WHEEL IN-HOUSE DEVELOPMENTS



Lightweight forged wheel



Off-road wheel

Group Energy Storage Systems E/E

OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

GROUP
E/E

GROUP
WHEELS

**GROUP
ENERGY STORAGE SYSTEM E/E**

GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Norbert Blechl

Group Leader Energy Storage Systems E/E

20 FTE
PM

13 FTE
CAD

3 FTE
Concept

5 FTE
CAD BCC



41 FTE

Group Energy Storage Systems E/E

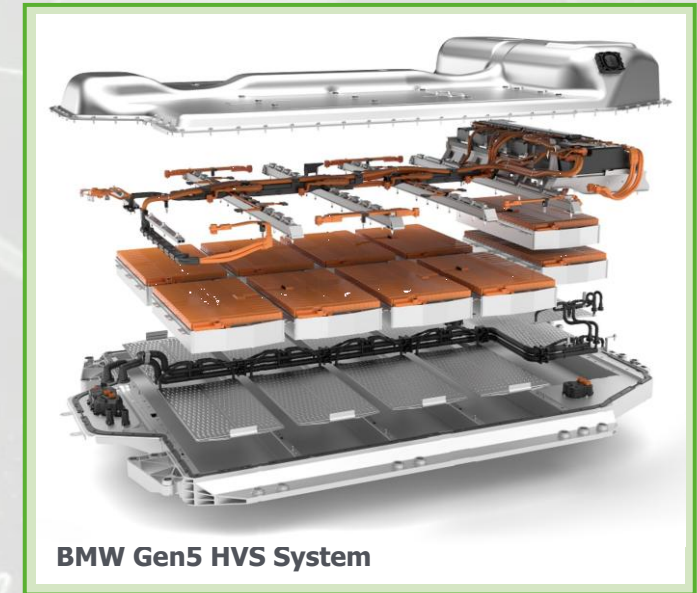
SERVICES

Focus Areas

- Design and construction of:
 - High-voltage wiring harness
 - High-voltage module connectors
 - Power pack connections and power distributors
 - High-voltage connection panels
- Design and development of high-voltage relay box
- Design and integration of high-voltage control units

References

- BMW HVS Gen5.x
- BMW HVS Gen6
- BMW FCEV



Group Energy Storage Systems E/E

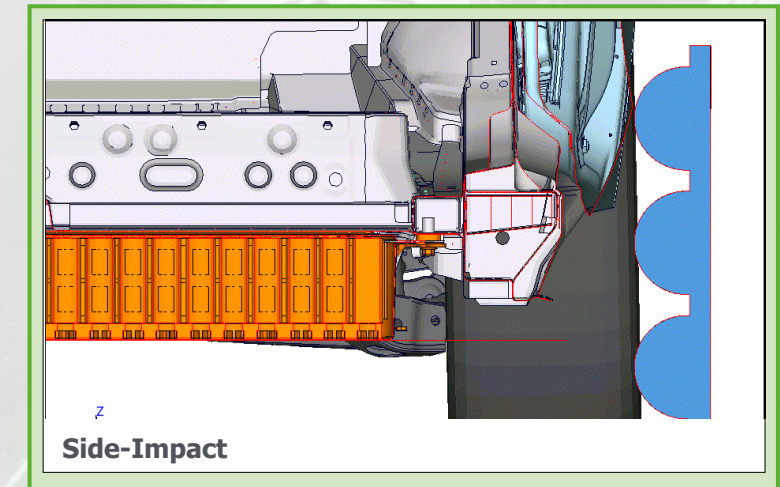
SERVICES

Simulation

- Whole vehicle Simulation (Front , Heck and Side Crash)
- Shock-Simulation (abuse, sleg, Special events)
- subsurface structural strength
- Overall vehicle Frame integration
- China/ECE-Crush
- Modal analysis (Fix-Fix , Free-free , Trim Mass Body)
- Strength simulation (Operational load analysis, Power Spectral Density)
- FEMFAT-Simulation (Service life)

References

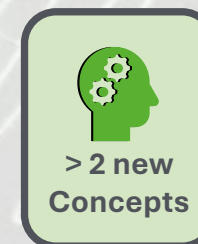
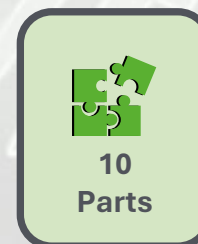
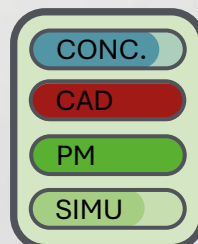
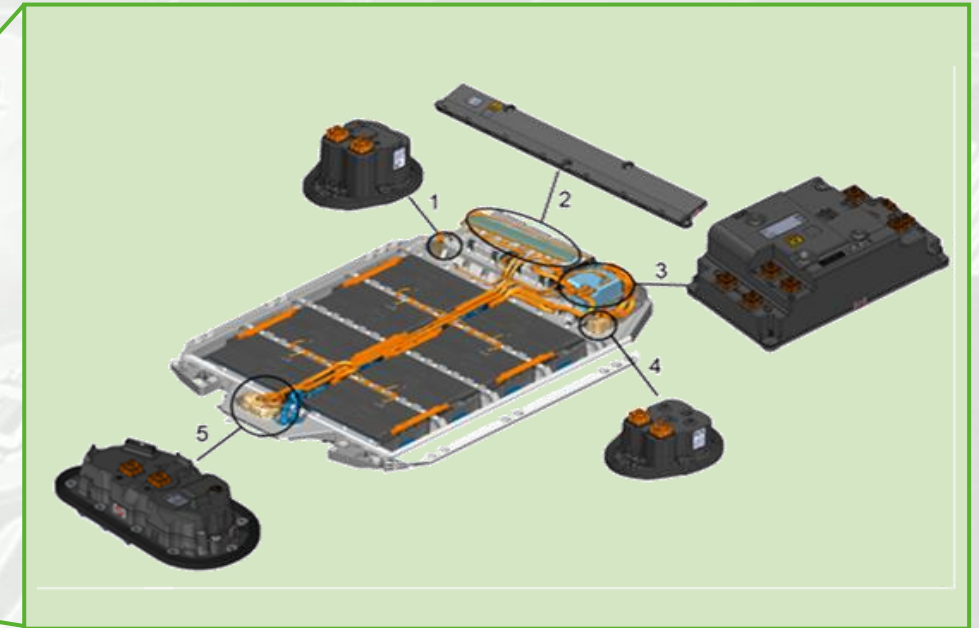
- BMW HVS Gen5.x
- BMW HVS Gen6
- BMW FCEV



Group Energy Storage Systems E/E

PROJECT EXAMPLE: CONTROL UNITS

- Design and location of iX3 BEV control units
- BMU (Battery Management Unit)
- Basic CP (electric motor power distributor)
- NA-CP (power distributor for auxiliary units)
- Power-CP EM (electric motor and EES connection panel)
- Power-CP DC (charging socket and EES connection panel)
- CSC (cell monitoring electronics)



Group Energy Storage Systems E/E

PROJECT EXAMPLE: DEVELOPMENT OF SWITCH BOX FOR OEM

- Development of electrical and electronic control unit for various energy storage systems and electric motors
- 400 V or >800 V variant or switching variant
- Calculation of clearances and creepage distances, screw connections, cabling, special modifications e.g. pyrotechnics, HV busbars in aluminum/copper, switching units, control boards and shunts

Concept Phase

Prototype phase

Series Phase

SOP

Sections and concept models in CAD

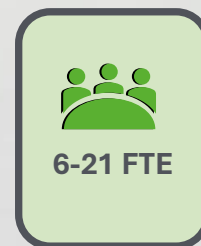
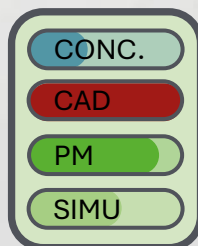
Coordination of component function

Production of sample components

Carrying out coordination and prototype requirements planning

Design / component development / preparation of shop drawings

Change management, supplier management, component support at the OEM



Group Simulation

OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

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E/E

GROUP
WHEELS

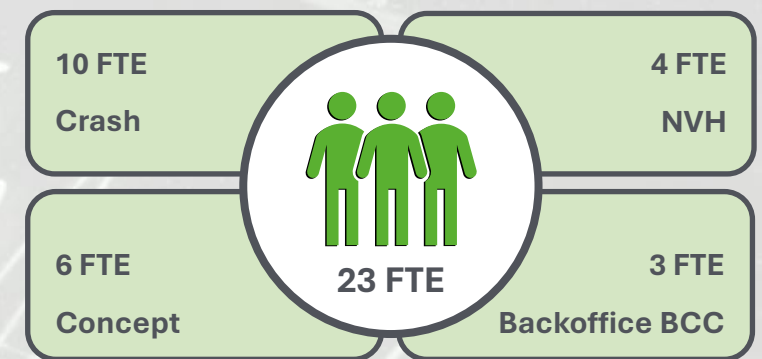
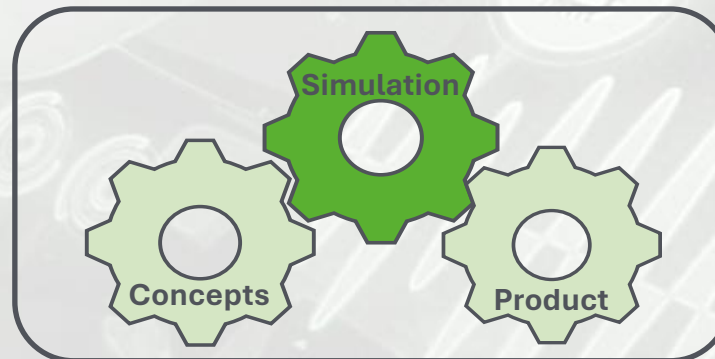
GROUP
ENERGY STORAGE SYSTEM E/E

GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Hossein Nasirian
Group Leader Simulation



Group Simulation

SERVICES

Programs

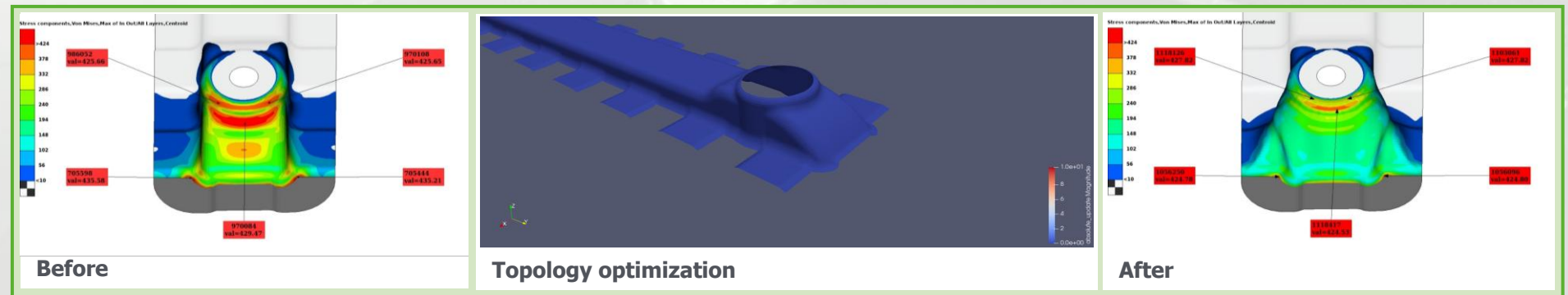
- DynA (dynamic)
- Abaqus (dynamic und static)
- Marc (static)
- Nastran (Noise Vibration and harshness)
- FEMFAT
- Pamcrash (dynamic)

Programming languages

- Python
- C++

References

- BMW new 3 Series platform BMW new X-series
- RECARO
- MAGNA



Group Fuel Supply Systems

OVERVIEW

DEPARTMENT 2

GROUP
SEATS

GROUP
PRE-DEVELOPMENT

GROUP
E/E

GROUP
WHEELS

GROUP
ENERGY STORAGE SYSTEM E/E

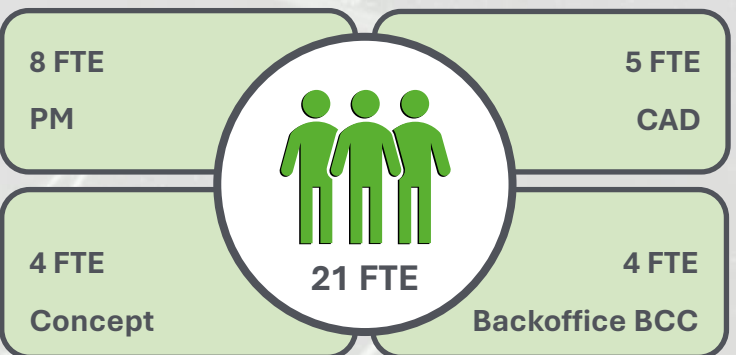
GROUP
SIMULATION

GROUP
FUEL SUPPLY SYSTEMS



Klaus Heilrath

Group Leader Fuel Supply Systems



Group Fuel Supply Systems

SERVICES

Focus Areas

- Supply systems for:
 - Liquid fuels
 - Hydrogen
 - Urea (Ad-Blue)
- Components:
 - Container and attachment
 - Filling system
 - Feed module
 - Venting system
 - Lines and pipes
 - Tank protection
 - Activated carbon filter
- Development of brake and vacuum systems

References

- BMW FCEV
- BMW:
 - 3er, 5er, 7er, X1, X3 ff., X5 ff., Z4
 - BMW M AG Vehicles
- Rolls-Royce, Mini

Group Fuel Supply Systems

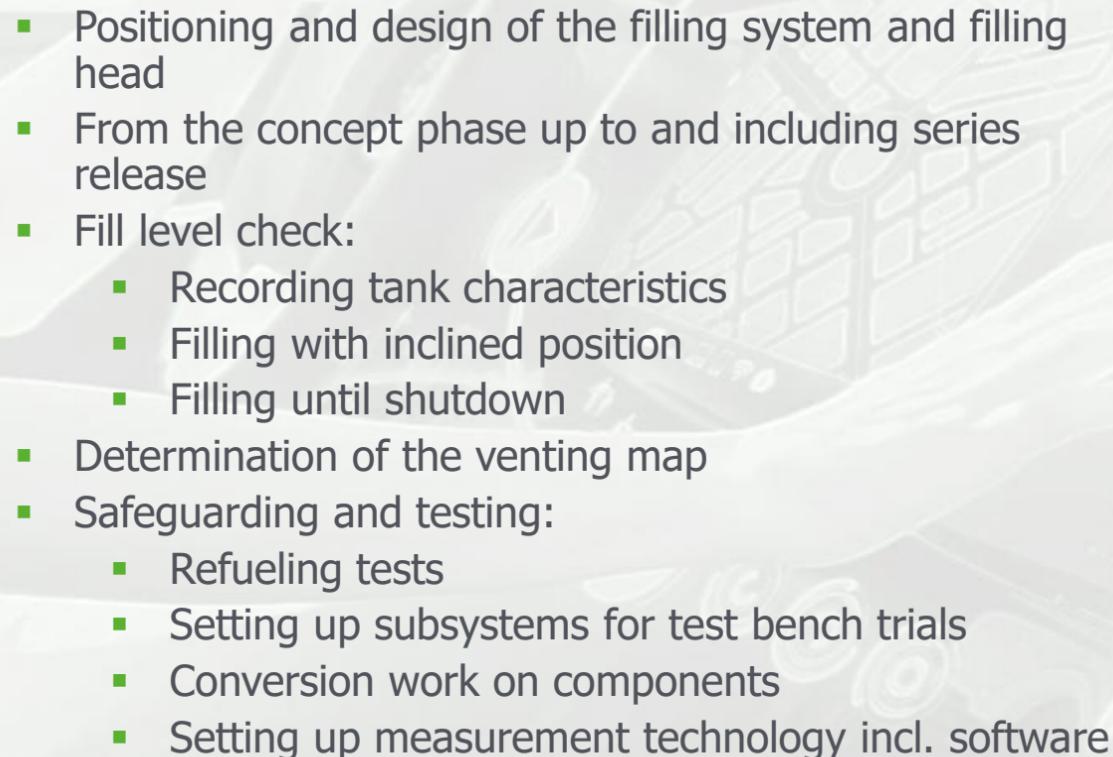
SERVICES

Simulation

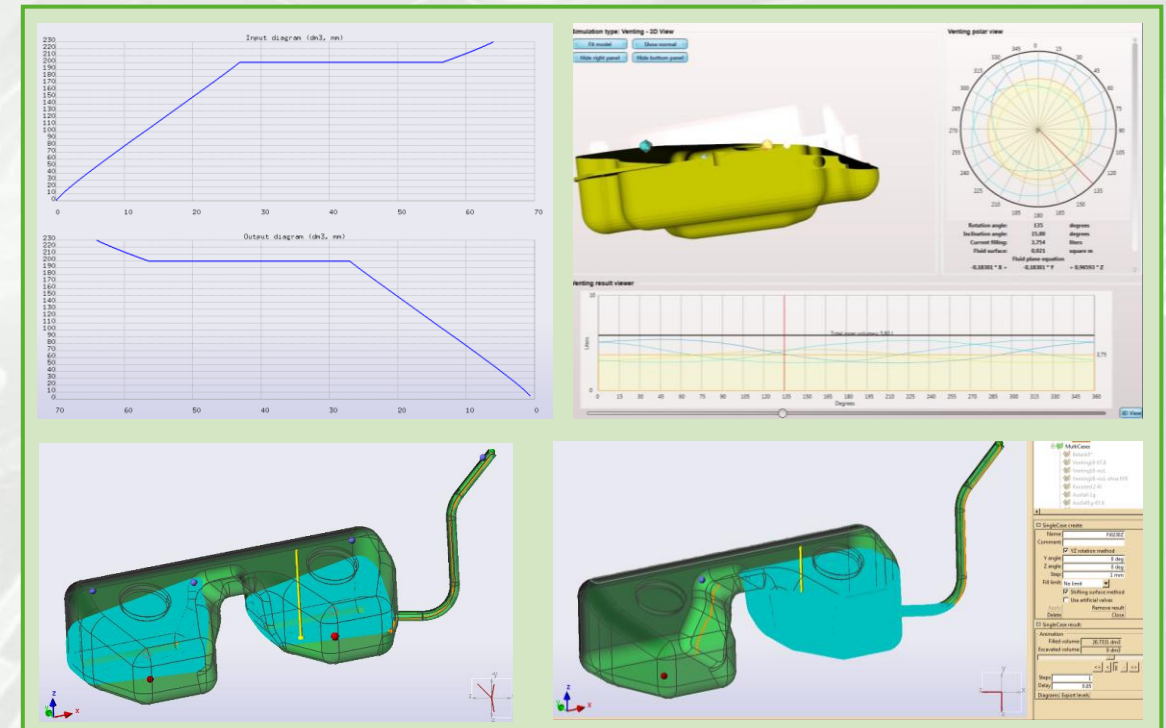
- Networking of components and systems, e.g. for crash simulations
- Fastening elements / tensioning strap
- Filling
- Venting system
- System failure

References

- BMW FCEV
- BMW:
 - 3er, 5er, 7er, X1, X3, X5, Z4
 - BMW M AG Vehicles
- Rolls-Royce, Mini



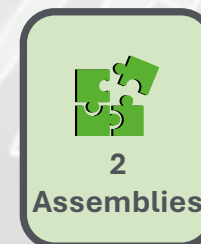
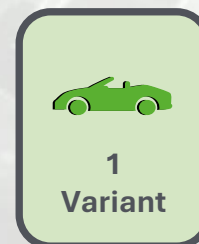
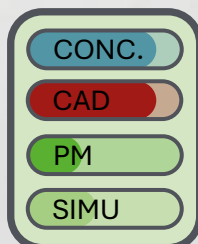
- Positioning and design of the filling system and filling head
- From the concept phase up to and including series release
- Fill level check:
 - Recording tank characteristics
 - Filling with inclined position
 - Filling until shutdown
- Determination of the venting map
- Safeguarding and testing:
 - Refueling tests
 - Setting up subsystems for test bench trials
 - Conversion work on components
 - Setting up measurement technology incl. software



Group Fuel Supply Systems

PROJECT EXAMPLE: DESIGN FOR H2 TANK SYSTEM - UP TO 700 BAR

- Concept study on H2 storage systems
- Concept design to series development
- Installation space investigations
- Modification designs of subsystems and components
- Component design, drawing creation and release support
- Design and construction of production aids and test devices



OVERVIEW

AMITRONICS

STRUCTURAL DYNAMICS

BRAKE ACOUSTICS

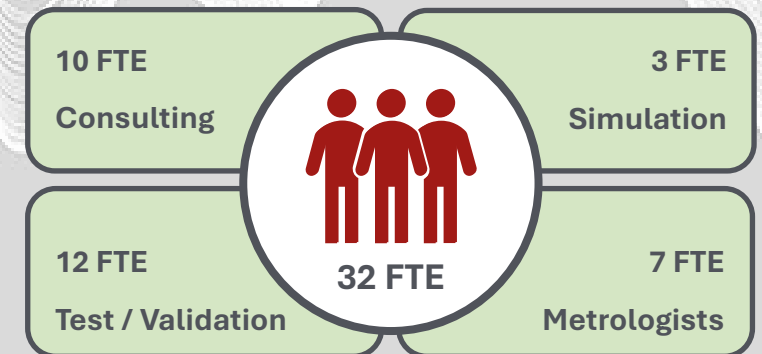
TEST/VALIDATION

SIMULATION

METROLOGY LABORATORY



Dr. Norbert Rümmler
Managing Director AMITRONICS



SERVICES: MEASURE. EVALUATE. OPTIMIZE.

Focus Areas

- Automated evaluation and comparison of simulation and test results
- Signal analysis in the fields of structural dynamics and technical acoustics
- Developing dedicated software for process and interface automation
- Application and further development of machine learning and AI methods

Programs

- Python
- MATLAB
- VBA

Messtechnik

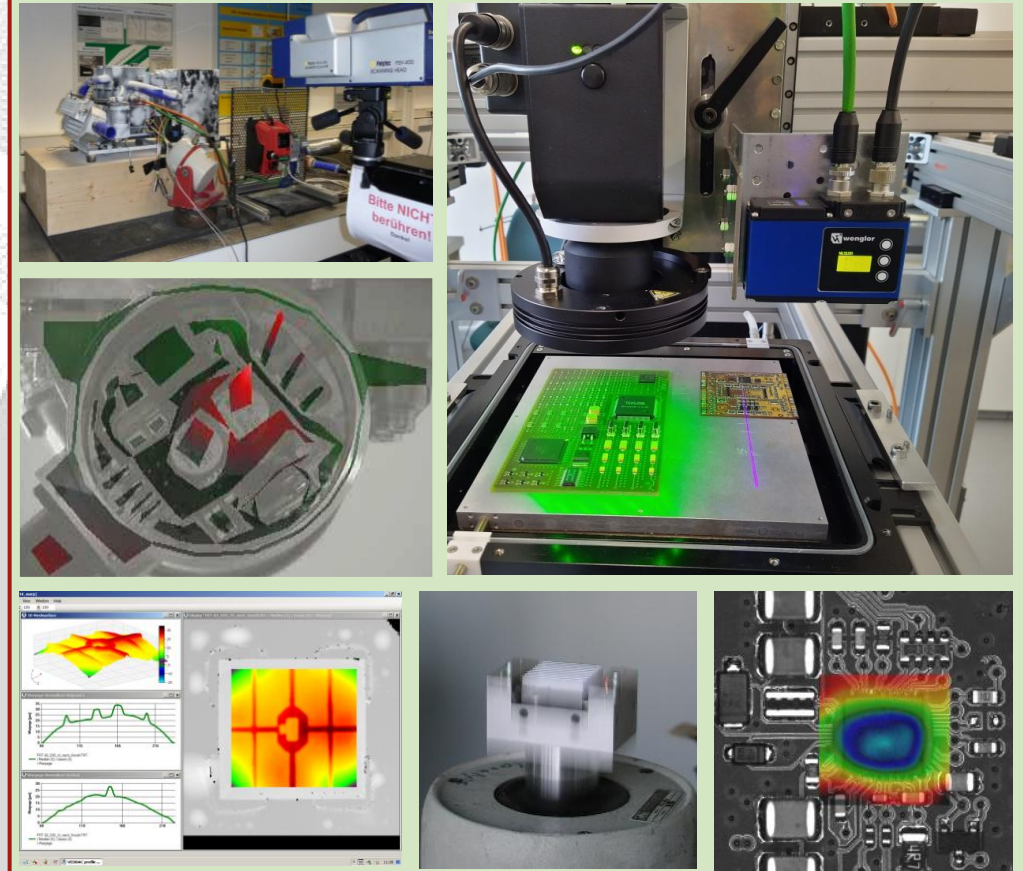
- Laser vibrometry
- Modal analysis
- Sound analysis
- Mobile analysis
- Digital image correlation
- High-speed camera
- 3D scanner
- Alpha cabin



PROJECT EXAMPLE: THERMOMECHANICAL RELIABILITY OF ELECTRONIC COMPONENTS

- Requirements management
 - Environmental and operating conditions, Test specifications and standards (DIN, ISO, MIL)
 - Thermomechanical and structural dynamic weak point analyses
- Temperature distribution and gradients natural and operating frequency analyses
 - Deformation and vibration shape detection
 - Weak point analyses and layout adjustments
 - Material characteristics and simulation comparison
- Environmental simulation
 - Vibration tests and shock tests coupled with temperature and humidity
- Change management

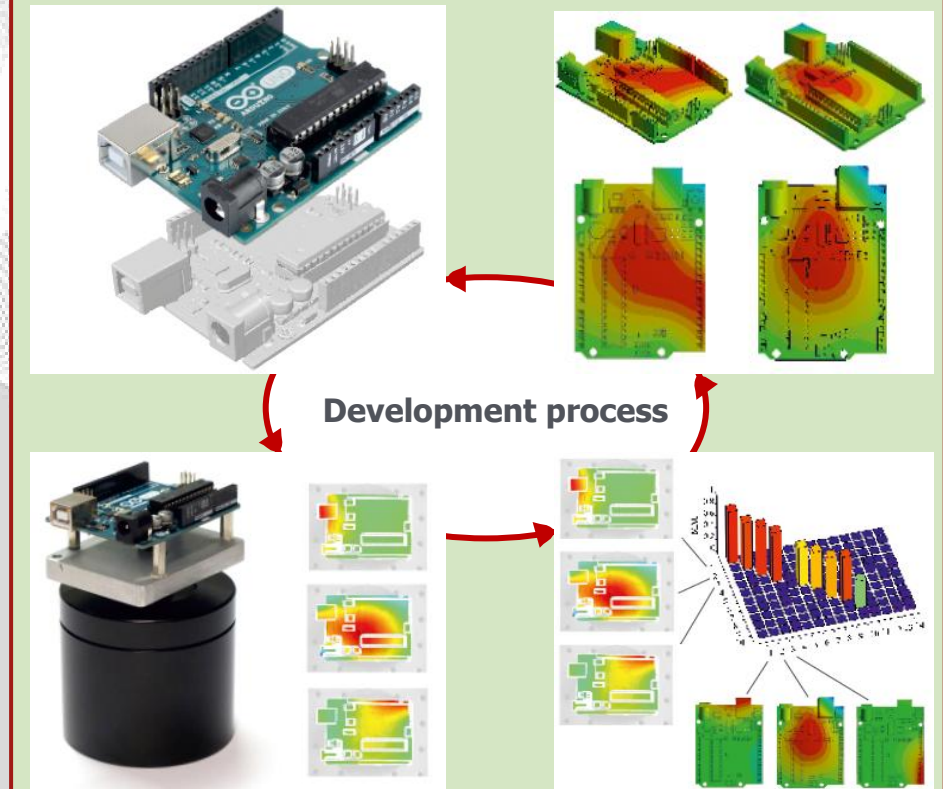
Experimental analyses



PROJECT EXAMPLE: VIBRATION-OPTIMIZED ELECTRONIC ASSEMBLIES

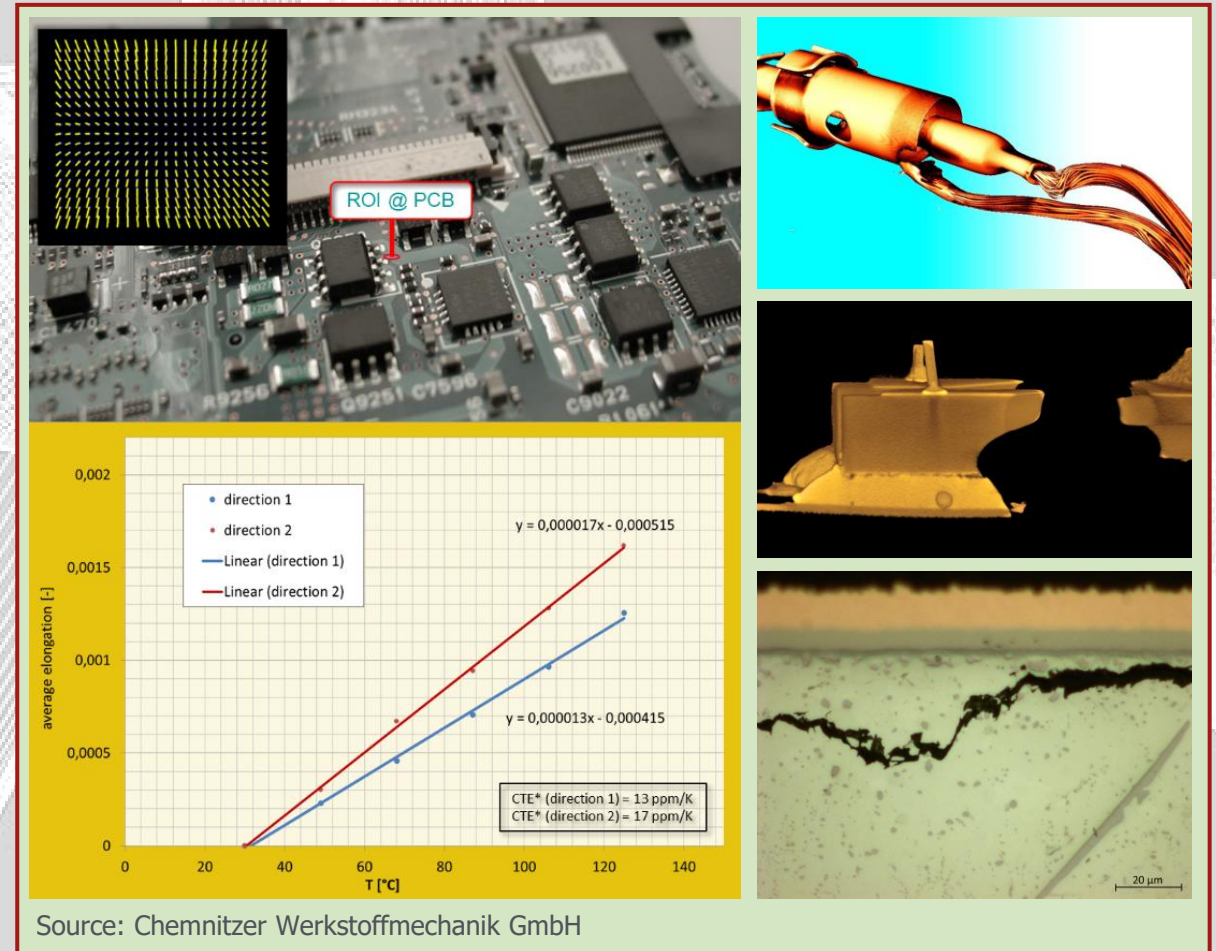
- Experiment
 - Modal analysis
 - Operational vibration analysis
 - Mission Profiles
 - Vibration test and shock test
- Reliability analysis
 - Model revision/adaptation
- Simulation
 - Modal analysis
 - Harmonic and random response
 - Transient analysis
- Optimization
 - Design and layout, connection
 - Vibration load

Holistic approach to analysis and optimization



PROJECT EXAMPLE: MOVEMENT, DEFORMATION AND DAMAGE ANALYSIS

- microDAC® - Image analysis
 - Result visualization of movement profiles, displacement and strain fields
 - Result data in the form of displacement and strain values, mean displacements, strains and characteristic values derived from these (modulus of elasticity, coefficient of thermal expansion)
- Deformation measurement
 - under tensile, compressive or bending load
- Thermomechanical characterization
 - Damage analysis using CT
- Complete, high-resolution and three-dimensional imaging
 - Metallography
 - Varied microscopic imaging of the microstructure



WORKSHOP



Rainer Fink
Workshop Manager

Services Workshop

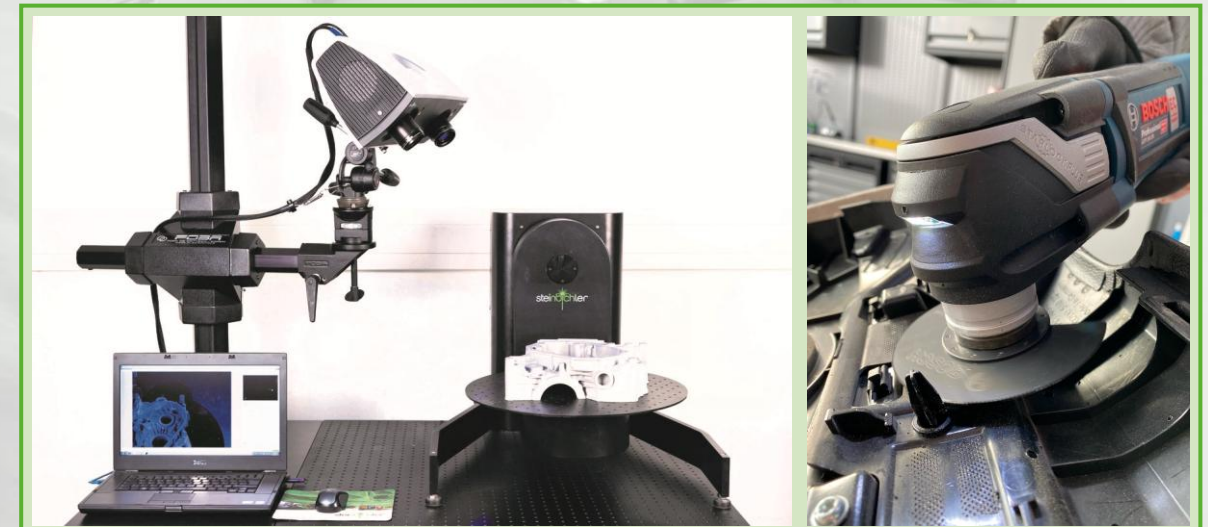
TESTING, VALIDATION AND CONVERSION

Services Workshop

- Workshop
 - Reworking small seriesPrototype constructionVehicle conversion
- Testing and measurements
 - Vibration analyses
 - Shock tests
 - 3D surface scans with reverse engineering
 - Sound absorption coefficient measurements
 - Airborne sound investigations for sound pressure and sound power measurements

Key Facts

- Workshop area of over 1000 square metersPrototype protection (TISAX) Crane with lifting capacity of up to 3 tonsVehicle lifts



EVO-CAMPUS



"Our campus offers inspiring and targeted expertise to meet future challenges with curiosity, clarity and foresight."



Karin Geiselbrecht

Team Leader HR and Campus

Specialist training

Business-Coaching

Personality development

Vision-Workshops

Team development

BMW Academy

For:

EVO employees

AMITRONICS

Partners & customers





Siegfried Bugl
Managing Director / CEO



Markus Pfuhler
Business Development Manager



Tobias Zirngibl
Head of department / CTO



Emre Sahanoglu
Business Development Manager



Peter Freivogel
Head of department / COO



Roland Schleicher
Business Development Manager

References

Zollner



MOLABO

handtmann
Ideen mit Zukunft.

SAI
SUPERALLOY



SIEMENS



RECARO

Whitemark
battery thermomanagement done right



MAGNA



brose
Technik für Automobile

Hörauf & Kohler

BOYSEN
INNOVATIONEN ABGASTECHNOLOGIE



PIËCH



INEOS | GRENADIER

DR. SCHNEIDER
UNTERNEHMENSGRUPPE



HW HOLZ WASTL
Handelsges.m.b.H.

SMP

FORVIA
Inspiring mobility



WIEGAND
ENTWICKLUNG. KONSTRUKTION. PRODUKTION.

RONAL GROUP

OTTO FUCHS

STABILUS

PIERBURG
PUMP TECHNOLOGY



Webasto

HILTI



bayern innovativ
Innovation leben.



bavAIRia
Europe's heart of aerospace
and navigation

bayme vbm
Die bayerischen Metall- und Elektro-Arbeitgeber

THA Technische
Hochschule
Augsburg



Fraunhofer
ENAS