tech-solute GmbH
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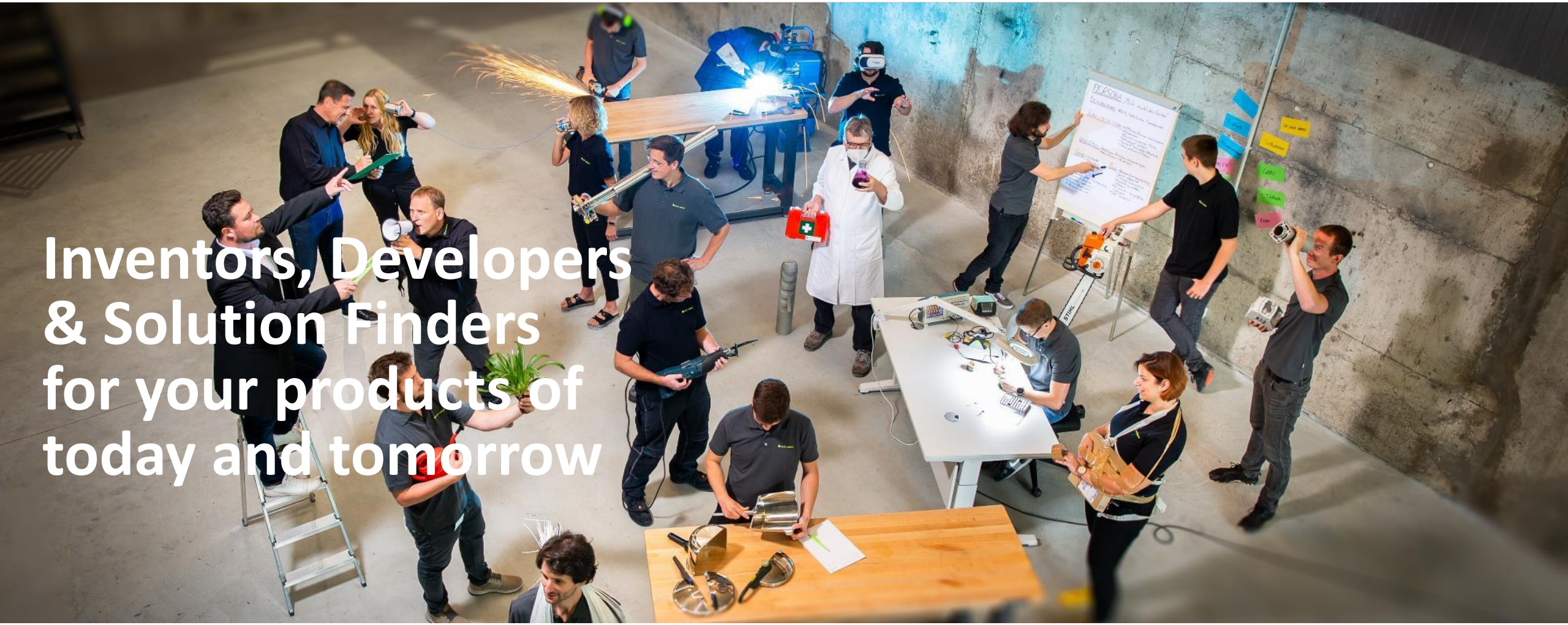


Inventors, Developers & Solution Finders for your products of today and tomorrow

We identify innovation potentials

We evaluate feasibility

We develop series products

We develop special machinery

We improve existing poducts

Discover the engineering world of tech-solute!

We are your **idea engine** for **innovation** and **product development**.

- User wishes and needs are always in the foreground
- Development of mechanics, electronics and software up to series production readiness
- Unique process system and methodology
- Unbiased view beyond the technological horizon
- Cross-industry

Scientific foundation from several years of innovation research at the Karlsruhe Institute of Technology (KIT)

> 170 customers from a wide range of industries

More than 1,700 projects to date

approx. 2.7 million € turnover/year

> 26 employees:
2 CEO
15 engineers
1 chemist
1 computer scientist
3 technicians
1 team assistant
3-5 trainees

Founders and Managing Partners:
Dr.-Ing. Dirk Schweinberger und Dr.-Ing. Marcus Saak

Realizer of both complete development projects and individual subtasks

Active member of
AEN e.V.
HubWerk01 e.V.
Cyberforum e.V.
fokus.energie e.V.
GfP e.V.
BVMW

Member of a strong **expert network** of development partners, technology providers and universities

2007+2011 Innovation Award of the Technologiefabrik Karlsruhe
2007 Cyberchampion special prize of the Cyberforum
2014 Among the three most innovative service providers in Baden-Wuerttemberg
2017 BVMW UnternehmerSTAR in the category digitalization
2019+2020+2021 Top employer award

Navigation through the company presentation

Range of services

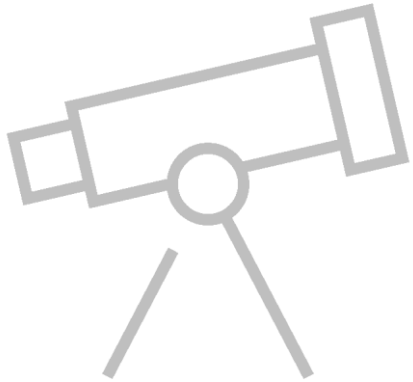
Project examples

About tech-solute

We identify innovation potentials

We help you to

- understand your stakeholders better
- identify unmet customer needs
- exploit the opportunities of new technologies
- generate competitive advantages



Analyzing the environment

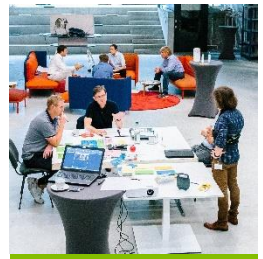
- Trend analyses
- Competitive analyses and comparisons
- Technology monitoring

Benchmarking

- Product research and comparisons
- Product benchmarking

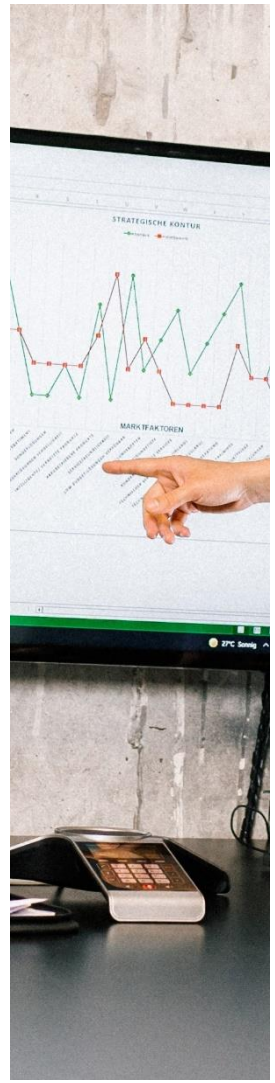
Identificating customer needs

- Persona Workshops
- User analyses
- Surveys & interviews



Developing strategies

- Status Quo workshops
- Target workshops



Ideation

- Idea booster
- Design sprints

We evaluate feasibility

We help you to recognize

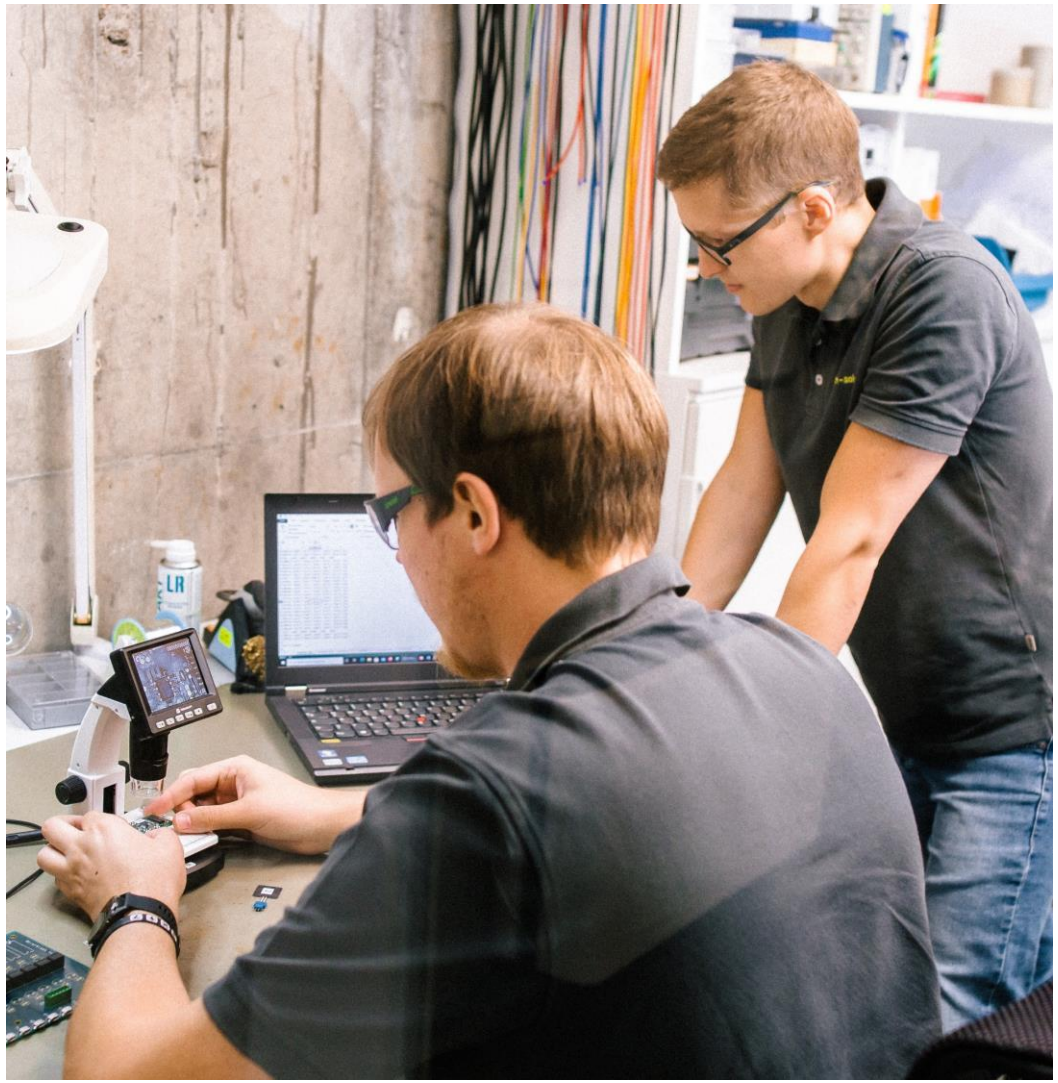
- the real potential of an idea or favored technology
- projects which are likely to fail

Checking the potential of ideas

- Potential analyses
- Business model check

Verifiying the technological potential

- Technology assessments
- Experimental gain of knowledge



We develop series products

We help you to

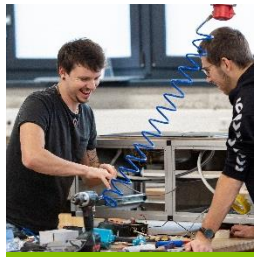
- develop solutions from ideas that meet requirements and can be produced cost-effectively
- ensure CE conformity
- identify and eliminate errors in development results

Developing realization concepts

- Goal setting workshops
- Finding/inventing solution approaches
- Design and validation of an A sample
- Detailing of the solution approach to the system concept
- Design and validation of a B sample

Bringing concepts to series maturity

- Creation of production-ready design
- Design and validation of a C sample
- Support during pre-series phase
- Support during zero series phase
- Support during series start-up phase

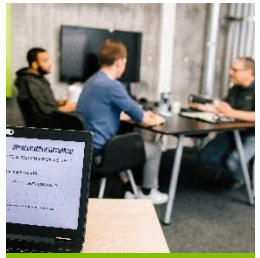


Building and testing prototypes

- Mock ups
- Functional sample
- Investor samples/ MVP
- A sample / demonstrator
- B sample
- C sample
- Testing (incl. Test bench construction)

Ensuring CE conformity

- Successful CE marking in just 10 steps



Protecting intellectual property

- Research and assessment of patents
- Assessment and increasing of the property right potential of inventions
- Development of patent bypass solutions
- Initiation and support of patent applications

Ensuring quality

- Moderation of FMEA workshops
- FMEA training
- FMEA methodology and process integration
- FTA
- Preparation of audits according to IATF 16949
- Risk analyses and risk assessments

We develop special machinery

- Realization of robust machines, systems, devices and fixtures for special tasks, from automatic welding machines to handling systems, laser systems, milling and punching machines to food processing systems and packaging machines

Developing special solutions

- Kick-off workshop for project orientation
- Pre-conception
- Concept detailling
- 3D design and electronics development

Ensuring CE conformity

- Successful CE marking in just 10 steps

Procurement, assembly and commissioning

- Procurment of production parts and buy-in parts
- Assembly of machine
- Putting the machine into operation

We improve existing products

- Make existing products and the services associated with them even more useful and attractive for stakeholders
- Identify and eliminate faults
- Reduce production costs
- Systematic troubleshooting

Improve quality

- Detection of low-quality points by means of FMEA, FTA etc.
- The critical view - weak point analysis by experts
- User analyses

Reduce production costs

- ReDesign-to-Cost initiative
- Modular development for the creation of variants
- Development of modular systems for series
- Kano workshops

Attraktivität steigern

- User & buyer experience workshops
- Product benchmarking
- Persona workshops
- User analyses

Solve technical problems

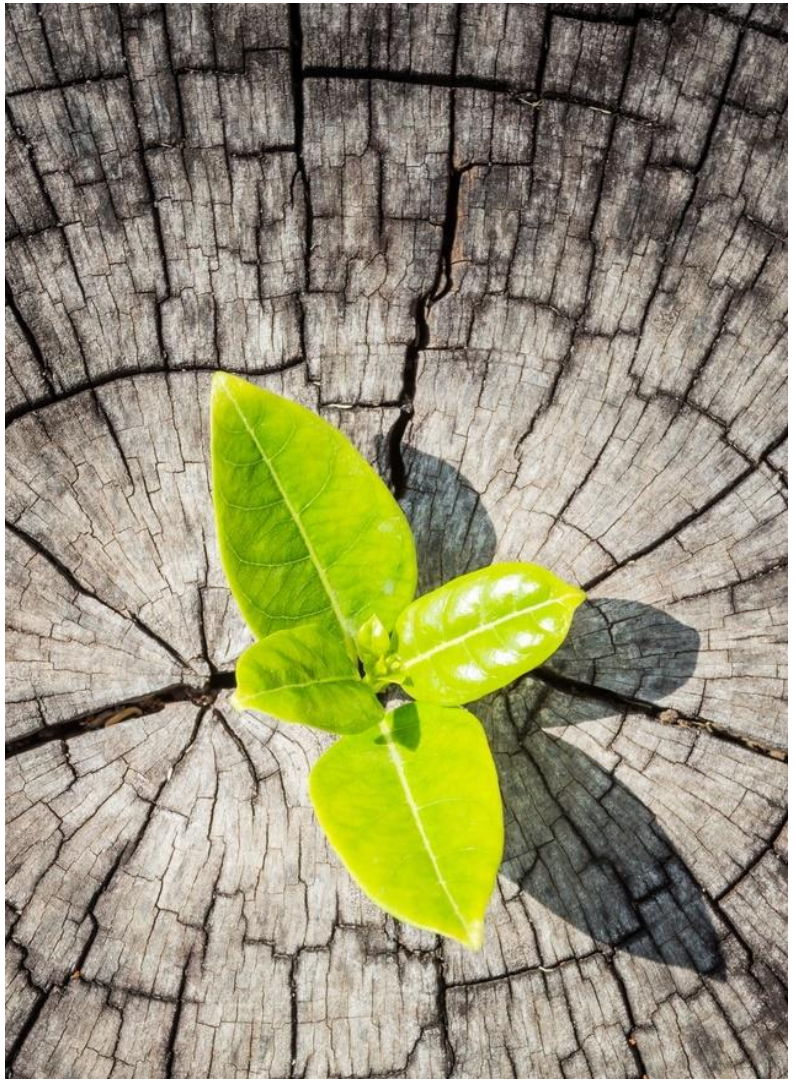
- Engineering „fire brigade“

Services for startups and investors

- We accompany start-ups in transforming their product idea into a marketable product
- We objectively advise investors on the assessment of an idea

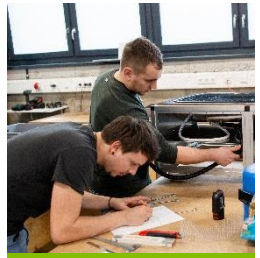
Idea put to the test

- Business idea: check potential
- Chance / risk analyses



Feasibility check

- Technical risk assessment
- Feasibility studies



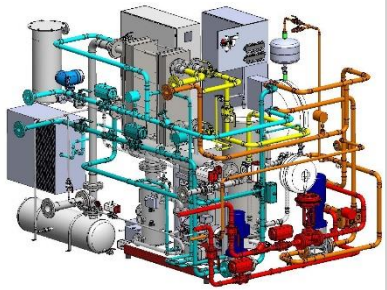
Implementation support

- Technical realization concepts
- Building of samples and prototypes
- Technical problem solving

Process engineering and system construction
Project examples

For future procedures and processes we consider in particular

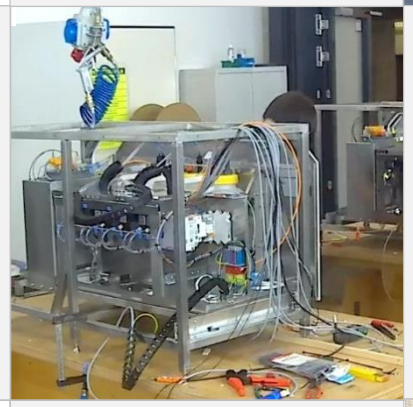
- the **responsible use of resources**,
- **Efficiency concerning raw material and energy** as well as
- **cost „attractiveness“**



Design of a control module for a **CO_2 Collector**

Design and realization of a low cost **Electrodialysis module** for brackish water desalination plants

Design and realization of a **containment-system for Klett-welding**



Optimization measures on an existing **plant for processing sheet gelatine**

Design and assembly of the A sample of a **high-speed composter**

Design and assembly of a **press for Klett-welding**

Engineering
Project examples

- We are experts for solutions, that cannot be bought „off the shelf“
- For us, Industry 4.0 means **sensible and moderate automation and digitalization**.
- We make complexity manageable by means of **modularization**

Development and assembly support of a **drilling and milling station** for machining steel beams

Development and assembly of a **Laser perforation system** for plastic strips

Development and assembly of a **system for sorting out defective shampoo bottles**

Development and assembly of a l**ab slicer for cold meats and cheese slices**

Development and assembly of a **welding portal for preparing the creation of watermarks in banknote production**

Conception of a **truck tower**

Automotive

Project examples

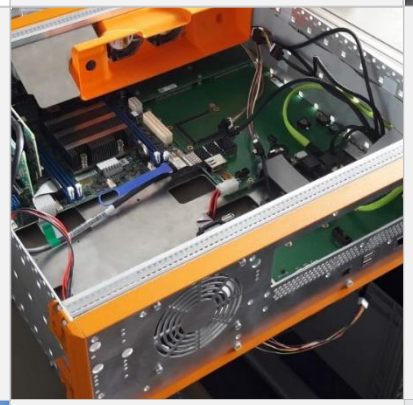
Our special strengths in the automotive area:

- **Conceptual pre-development**
- **Reduction of manufacturing costs** by means of alternative functional principles
- **Detection and elimination of failure risks** in products and processes by means of FMEA

Development of a **multi adapter for car windscreen wipers**

Development of a **temperature-independent boot lid damper**

Development of a **Housing with thermal management** for high-performance data loggers



ReDesign-to-Cost of a **Diesel piezo actuator**

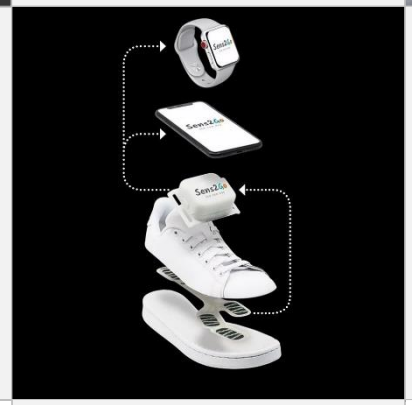
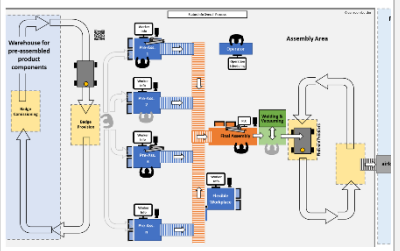
ReDesign-to-Cost of a **belt system**

Concepts for **high-performance e-charging points**

Pharmaceutical and medical technology

Project examples

With **creativity** and our knowledge of **requirements-based product design** (e.g. NDA conformity), we are happy to help you overcome the special challenges in the pharmaceutical and medtech industry.

Development of a **Pharma Lab**		Development of sub systems for **magnetic resonance spectroscopy**	
	Development of an **Unguator series**		Development of a **foot pressure monitoring system**
Concepts for (part) **automization of assembly processes** and fixture construction		Development of a **therapy table for osteopathy**	

Consumer goods
Project examples

Challenges in this branch:

- **Constantly changing customer needs**
- **Rapidly increasing technological possibilities**
- **Megatrends**
- **IoT**
- **The demand for a unique user experience at low cost**

We successfully manage the challenges by focusing our product development on the users.

Development of a **tea machine**

Development of a **filter system for water dispensers**

Development of a **Pickup kitchen**

Optimization of a **kitchen machine**

Development of a **„smart“ toilet flush**

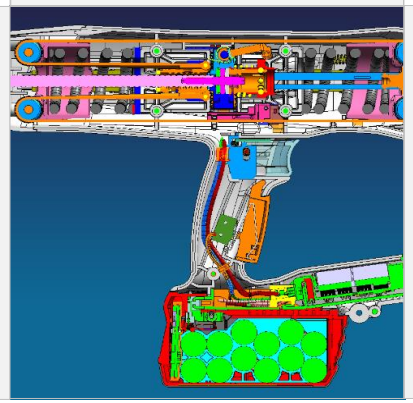
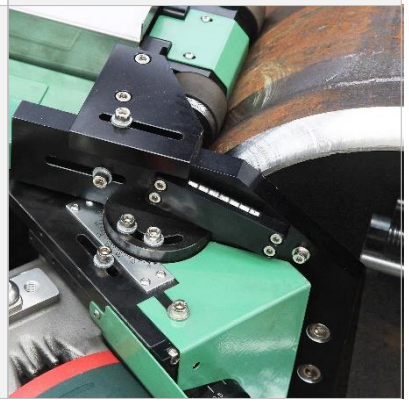
Development of a **solar kiosk** for the African market

Power Tools

Project examples

The development of power tools requires an intensive understanding of the overall system, consisting of **devices, tools, consumables, humans, environments and applications.**

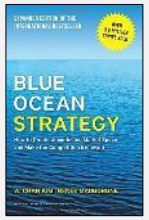
That's why we like to try out existing products intensively ourselves and quickly develop a feeling for what is not yet perfect.

Pre-development of **battery operated power tools**		Development of a **jackhammer** for the African market	
	Development of subsystems of **petrol-driven chainsaws**		Series development of accessories for **Battery-powered oscillator**
Optimization of a **battery-powered setting device**		Development of portable device for **chamfering pipes**	

Kernkompetenzen

Innovation

- Innovation methodology and management with a scientific foundation
- Identify stakeholder needs
- Identify innovation potential
- Develop innovation and differentiation strategies
- Balance the objectives of marketing, engineering and product management

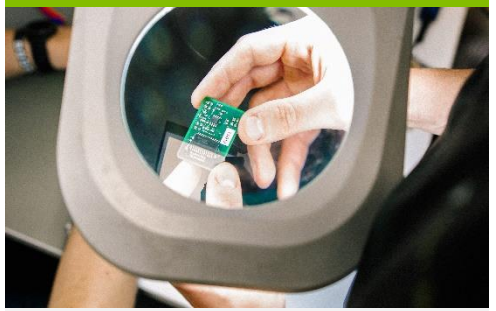


Mechanics development

- Generation of ideas and solutions
- Concept development and evaluation
- Design and calculation
- Feasibility studies
- Patent research and analyses
- Simulation (e.g. FEM, modal analyses, stiffness)
- CAD construction
- Component and supplier research
- Functional sample and prototype construction
- Testing
- CE preparation: Risk anayses, Parts lists, spare parts lists, maintenance plans
- Package optimization

SOLIDWORKS · SOLID EDGE · creo

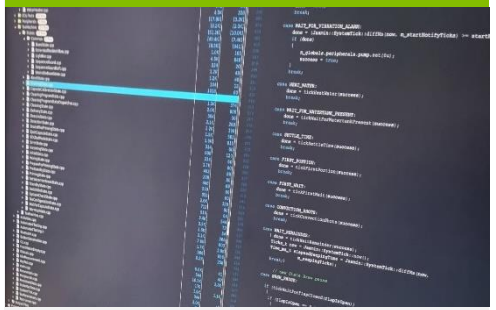
Electronics development



- Generation of ideas and solutions
- Concept development and evaluation
- Design and calculation
- Schaltungsdesign digital und analog:
  - Embedded systems
  - Metrology / Sensor systems
  - Energy supply: power supplies, battery technology and energy harvesting
- Layout design
- Fundamental simulations
- Mathematical analyses
- System and error analyses
- Component and supplier research
- Functional sample and prototype construction
- Testing
- CE preparation (e.g. EMV)

Altium · MATLAB SIMULINK · LabVIEW · EPLAN · CS EAGLE

Software development



- Embedded firmware development:
  - Microcontroller (manufactirer: nRF, ST, languages: C, C++)
  - Communication interface design (Bluetooth, WLAN, RFID, NFC, RS232, RS485, USB, UART, I2C, I2S, SPI, REST)
  - Linux (Ubuntu, Raspbian) with programming (bash, Perl, Python, C#, Java) and system configuration (cron, system services, apache, SSH, FTP, SSL, TLS)
  - Prototyping: ST Nucleo Boards / Raspberry PI / Arduino
- GUI- and HMI- and App-development incl. server backend
- Test automation
- Software architecture [XML]
- Machine learning (KNN, Fuzzy-logic, image /speech/gesture recognition)

C++ · C# · python · ENTERPRISE ARCHITECT

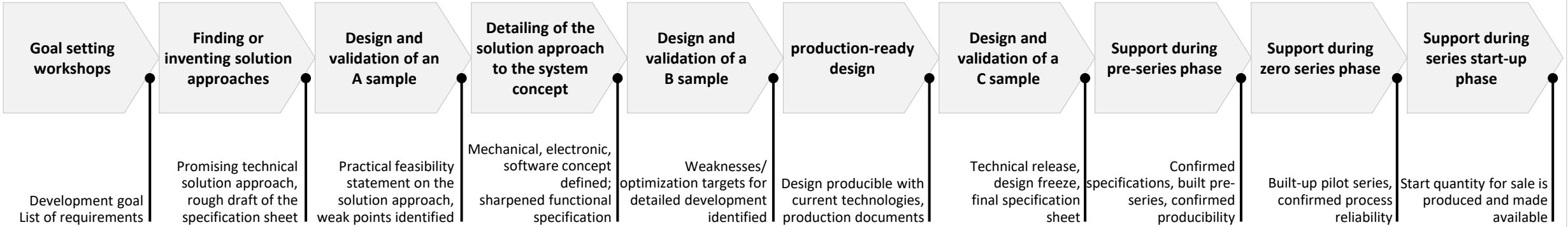
QS & Risik management

- Design FMEA
- System FMEA
- Process FMEA
- FMECA
- FMEA training
- FMEA methodology and process integration
- FTA
- Preparation of audits according to IATF 16949
- Risk analyses
- Risk assessments

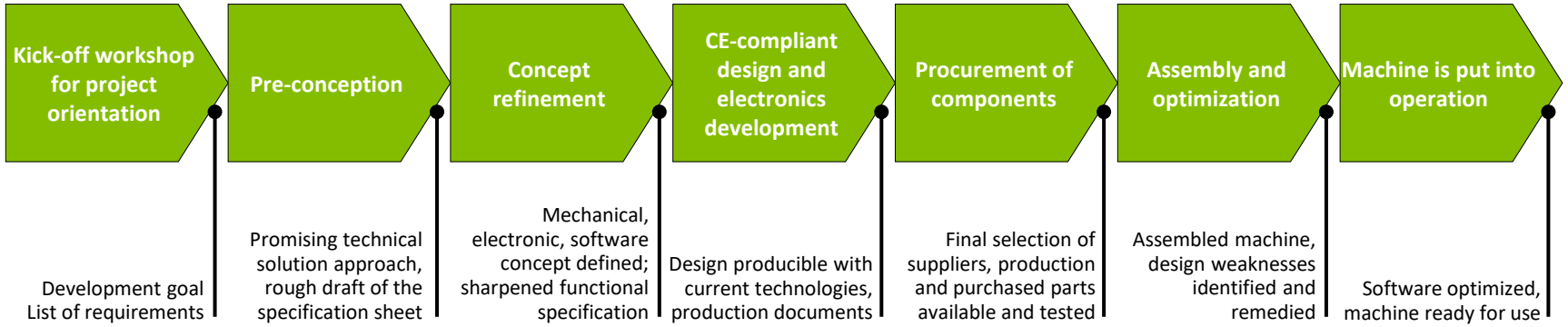
PLATO · APiS · iqs · pickert

Our development processes

Series products



Special machines and indivdual solutions

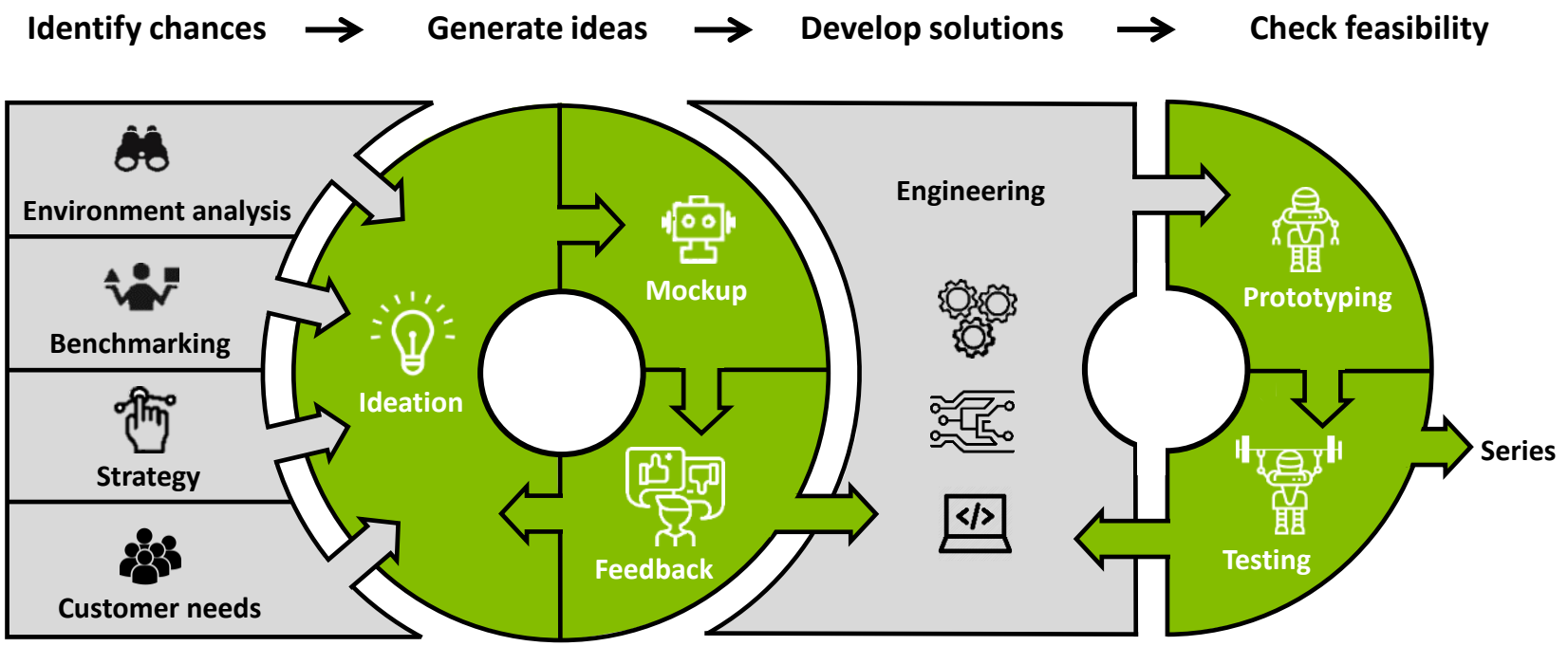


We do not leave product development to chance but follow proven and transparent development processes with clear target specifications.

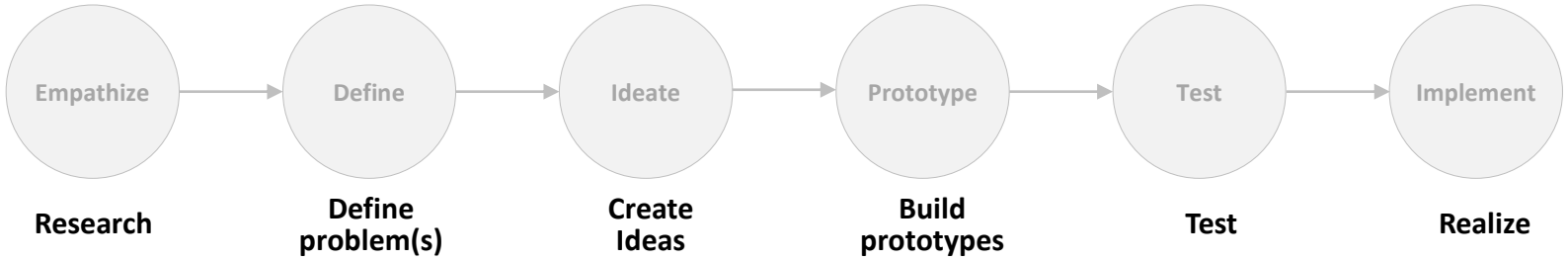
Design Sprints and pre-development

Our **ideas for product innovations** result from systematically identified opportunities with the focus on the **highest possible benefit for future users**.

During the subsequent **conceptual pre-development**, we concentrate on verifying the technical feasibility.



Our problem-solving approach is based on **Design Thinking:**



Experiment
Fail
Learn
Repeat

We are practised in **learning from experimenting and failing** to the extent that we do not overstretch or blow budgets or resources.

Our „recipe“:

- **Focused „Thinking outside the box“**
- **Method-based step-by-step procedure**
- **Consistent project controlling**
- Answering the daily question “**What is the next best step to take?“**

That's how innovation works!

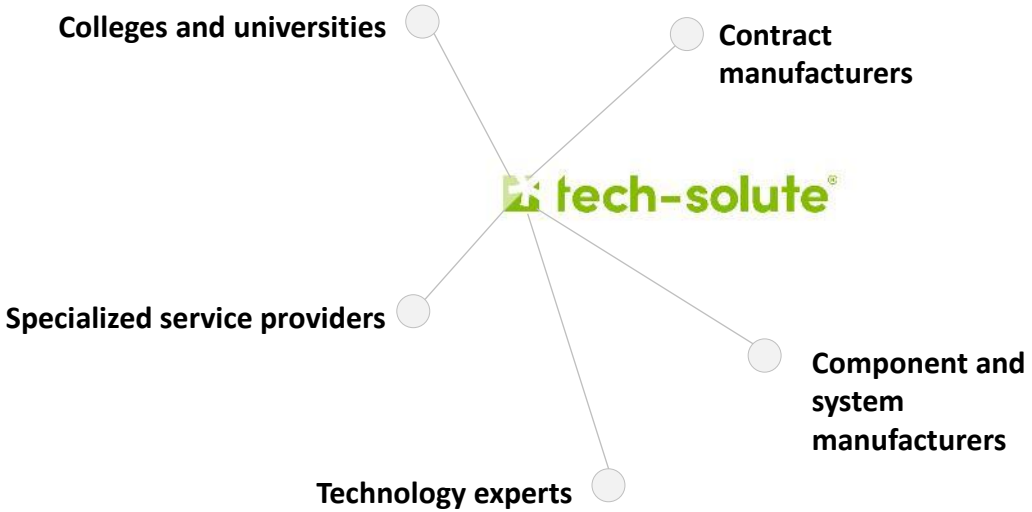
A strong network

Our claim is to always provide **excellent performance**.

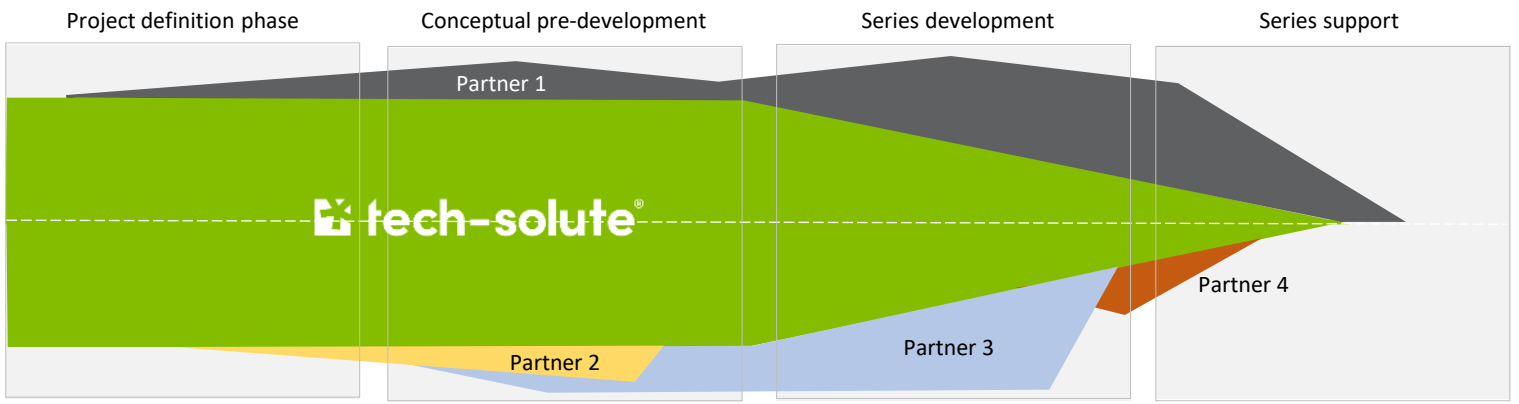
That is why we live by the principle: "**What others can do better than us, others should then do!**"

With "others" we mean our partners.

With our growing network of specialists, we are able to handle even **the most demanding projects**.



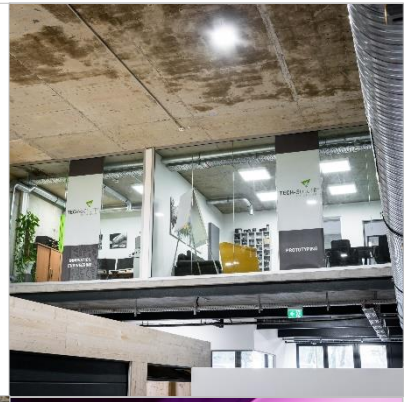
We involve our partners in projects as early as possible:



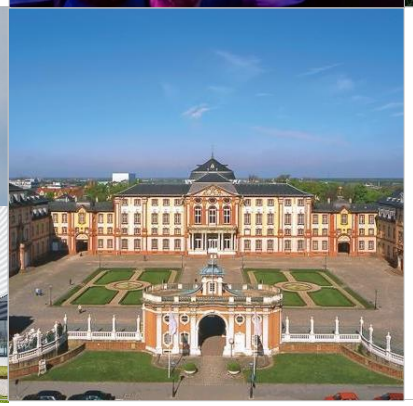
Our location

Inspiring surroundings for creative inventors

Based in HubWerk01, the digital hub of the Bruchsal region, in the TRIWO Technopark,…



…centrally located in Bruchsal, the centre between the Rhine plain and the Kraichgau region,…



…in the

TechnologieRegion Karlsruhe

Hightech meets the Good Life

KIT Karlsruher Institut für Technologie

Hochschule Karlsruhe Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

de:hub KARLSRUHE Artificial Intelligence

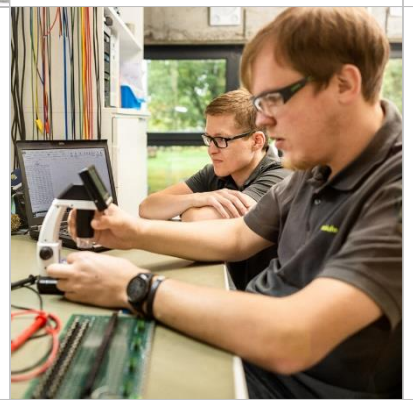
FZI

10 good reasons for working with tech-solute

We put together our **engineering teams** according to your requirements. During project work we economise on your resources, by acting **largely independently**, but coordinating every decisive step with you.

In the process, we always keep the project goals and your specific wishes in mind.

After an intensive exchange at the start of a project we have an in-depth understanding of your requirements, and you can “leave it to us” to provide what you need.

01 **We reach your goals fast, reliably and professionally**	02 **We think proactively - always considering your long-term interests**	03 **We look beyond the obvious and contribute real innovation**	04 **Our know-how is cross-industrial**
05 **We take an independent, agile and flexible approach**		06 **We offer you partnership on an equal footing**	07 **If there are uncertainties, we can take the initiative.**
08 **Our extensive experience minimises your risk**	09 **We provide mechanics, electronics and software from one source**		10 **We are engineers with a strong hands-on mentality**

Customers‘ opinions

Self-praise has a “bad taste”.

For this reason, we prefer our work to be praised by others.
With a **passion for technology, personal commitment, a hunger for change and the will to create something special**, we convince not only our customers. Here is what they have to say!

„From the first concept ideas to prototypes and their elaboration, we always manage to break innovative ground with tech-solute.“ Dr. Carel Karrar ANDREAS STIHL	**„Not only did tech-solute understand all the technical requirements, they also took account of the market situation and our customers' needs.“** Moritz Seger ZAHORANSKY	**„We were able to derive very great benefit from the discussions with you and the results you produced .“** Walter Lang WITTENSTEIN	**„We recommend brainstorming with tech-solute - it brings a breath of fresh air into your own company.“** Heimo Weber HÄFELE SCHNEIDER
„The flexibility in the workshop and in the employees' minds combined with the perceptible academic spirit make tech solute attractive to us.“ Markus Gessler WINTERHALTER GASTRONOM	**„Agile working is reality here.“** Pia Mersch MELITTA SINGLE PORTIONS	**„We have learned to appreciate the respectful and compromise-based way of dealing with each other very much.“** Ulrich Stemick GRUNDFOS WATER TREATMENT	**„With the competent and rapid support of tech-solute, we got the innovation project ready for series production in half the time usually required.“** Andreas Reichel APPARATEBAU
„…and the results are very good.“ Dr. Georg Maier ANDREAS STIHL	**„tech-solute employees have a real "research spirit" and a drive to always deliver the best..“** Ralph Diehl ALFRED KÄRCHER	**„Employees are willing to question existing solutions and react flexibly to requests for change.“** Dr. Hans Krattenmacher SEW EURODRIVE	**„From hardware to software, there has never been a challenge that tech-solute has not been able to master for us.“** Tim Grzeschik MELITTA SINGLE PORTIONS

Our customers

General enquiries
Referral to experts
Cooperations
Contracts

Fiona Kerstgens
Marketing & Sales Manager
+49 (0) 7251 93675-15
fiona.kerstgens@tech-solute.de

Development projects
Technical problem solving
Prototyping & testing

Oliver Seidel
Head of Overall Development
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Product strategies
Innovation kickstart
Workshops

Martin Mucha
Innovation Engineer (Mechanics)
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martin.mucha@tech-solute.de

Quality management
FMEA
Risk assessments
Risk analyses

Raphael Berger
Head of FMEA / Risk Analyst
+49 (0) 7251 93675-91
raphael.berger@tech-solute.de

We are looking forward to your task.