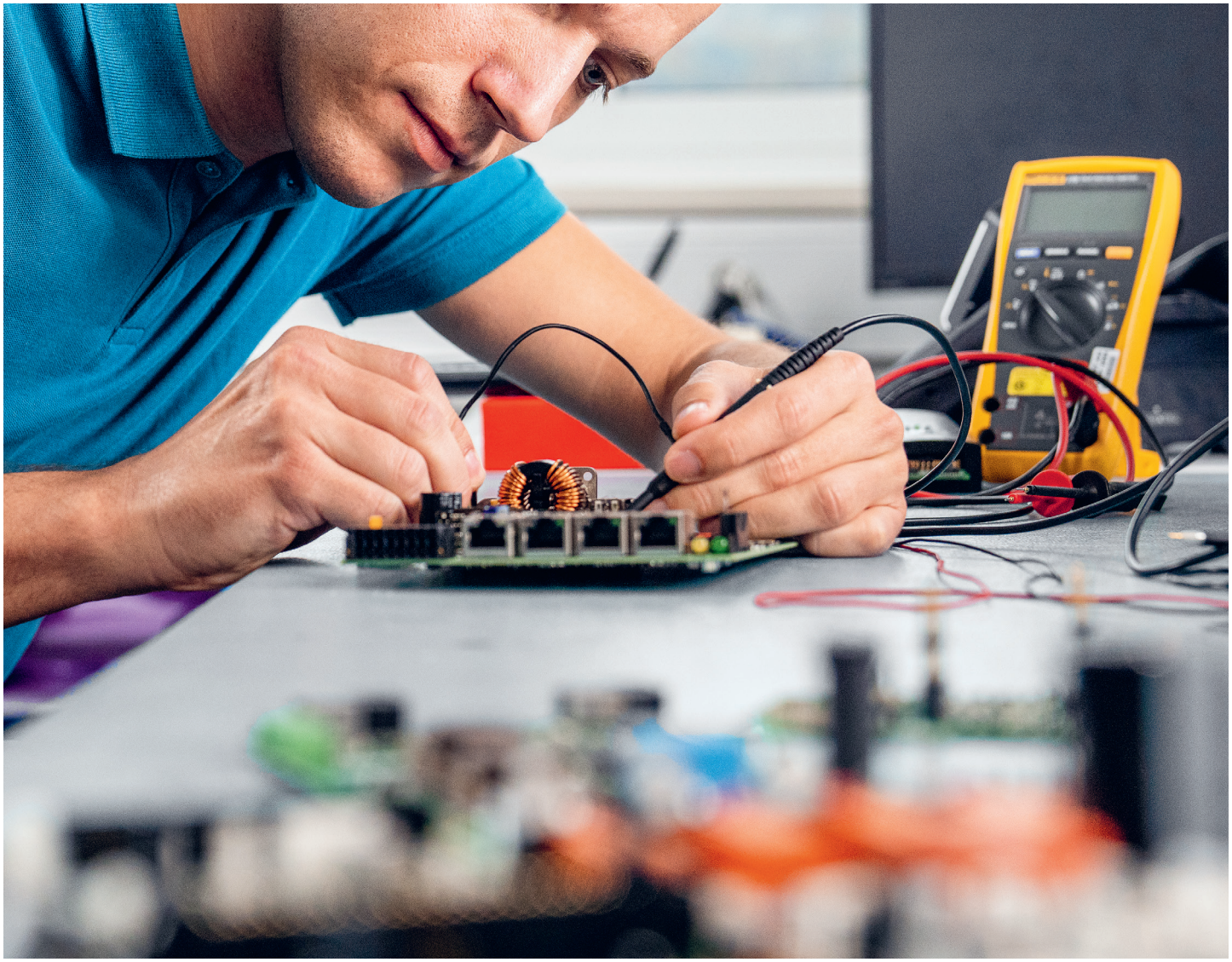
ENGINEERING

IFTEST

Electronic engineering for a successful product launch

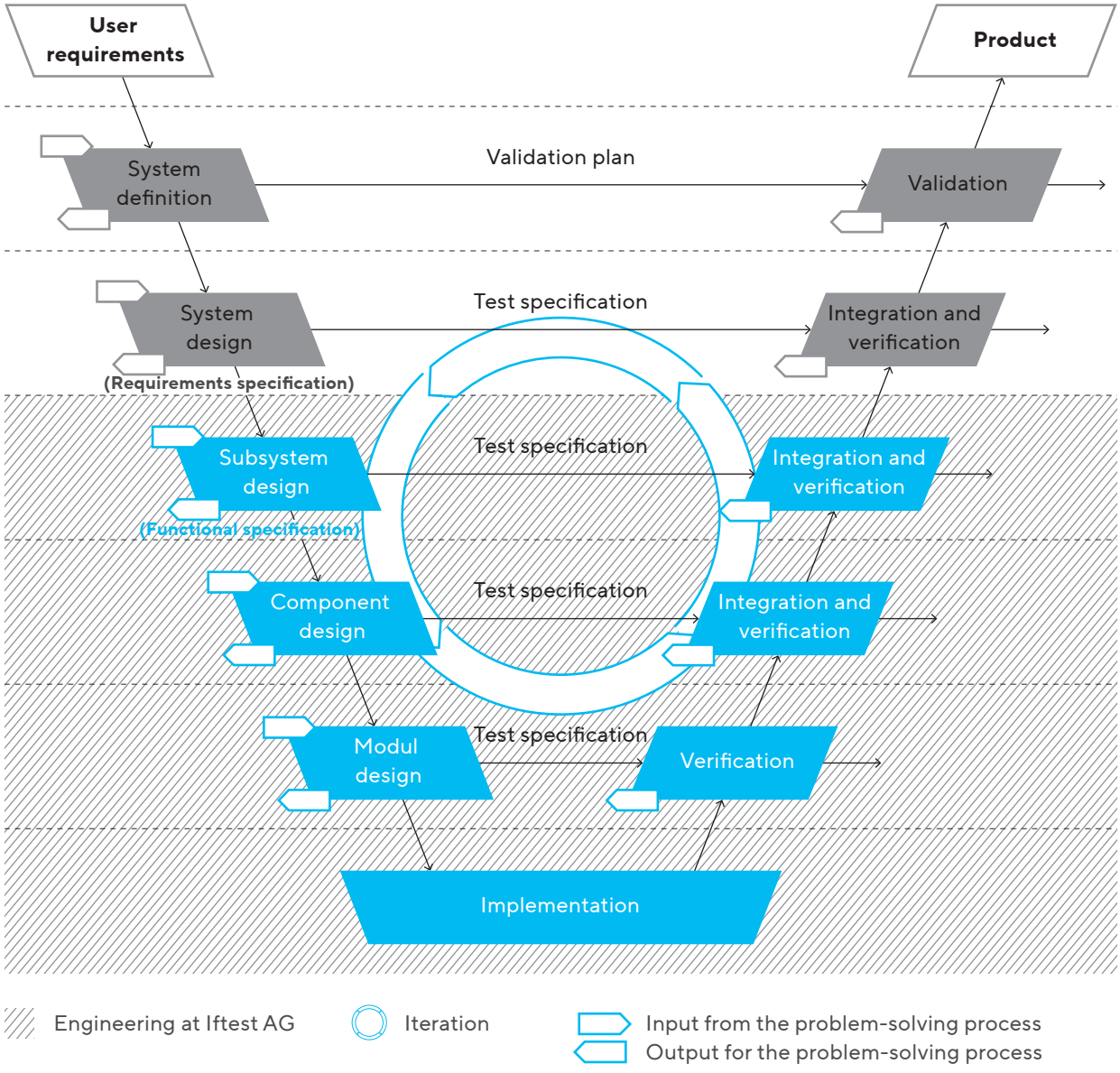


The journey from product idea to a successful market launch must be well thought out. Electronic engineering plays a key role here. In addition to function and reliability, compliance with regulatory requirements and guaranteed security of supply must also be ensured.

Process for successfully developing your electronic assembly

As agile as possible, as formal as required: during the development process, we strike a balance between the desired speed and complete compliance with all the approval criteria. Our clients formulate the requirements specification, including recommended or required guidelines, at an early stage.

We then use it as a basis to draw up the functional specification and drive the development forward. Taking this approach enables us to ensure that both the market launch and V-model documentation take place on time, thereby properly fulfilling all approval elements.



"Since we are close to our clients and have completed a large number of projects, we understand the critical obstacles and can help you reduce the associated risks."

Jürgen Schulz, Head of Technology at Iftest AG

Certifications

EN ISO 13485
ISO 9001
ISO 14001
IQNET
UL 796 / Z111

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Engineering
Overview of services

Our engineering services are geared towards cost-optimised serial production and a short time to market. They comprise everything needed for targeted development of an electronic assembly. The relevant aspects of serial production are also taken into account in the individual service packages.

CONCEPT/SPECIFICATION

Specifications that meet requirements and an appropriate solution concept form the foundation of a sound electronic design. We attach a great deal of importance to ensuring that we understand your requirements and expectations. This is the only way we can develop tailored solutions for you. We take the regulatory and manufacturing requirements into account at an early stage. Close cooperation between the client, purchasing, production, accredited testing centres and our electronics developers from the very beginning is the key to success. The result of this stage is the specification, including approval criteria and the optimal hardware/software architecture.

Requirements and expectations

- Consultation
- Solution concept
- Feasibility
- Proof of concept
- Requirement engineering
- Specification
- HW/SW architecture
- Test specification
- Approval criteria

HARDWARE ENGINEERING

The hardware design begins with the selection of suitable materials and components. In addition to the technical selection criteria, the lifecycle status, supplier selection, availability and costs all play a significant role when it comes to the ensuing serial production. In the subsequent circuit design, the functions in the intended area of application must be safe and reliable. Aspects such as EMC, as well as electrical and functional safety, must be taken into account early on. In the final design review, at least one independent, expert and experienced specialist will assess the result and verify that all relevant requirement are met.

Hardware functionality

- Component evaluation
- Safety, EMC, reliability
- FMEA
- MTBF
- Model design
- BOM
- HW design description
- Design reviews

PCB DESIGN

The PCB design is the critical point. It must meet the circuit technology, manufacturing technology and mechanical requirements. The different requirement categories often impede one another during the implementation process, resulting in the need to find compromises that do not affect the function, reliability, safety or manufacturability. This is where our experience in PCB design really pays off. Another advantage is that we combine engineering, industrialisation, purchasing and production under one roof. Before the PCBA goes into production, our experts critically assess the design. The result is close-to-production prototypes.

Design for Excellence

- Up to 16 layers
- Rigid/flexible
- Stack up
- High speed
- Impedance controlled
- Design rules check

PROTOTYPES

First and foremost, the purpose of prototypes is to assess the development result. Short procurement and production times are fundamental to efficient project progress. This is why standard materials and processes are used whenever possible, or we choose alternatives that have little or no relevance when it comes to the result assessment. Our specialists also review the design to ensure it is suitable for serial production. This allows us to produce several hundred prototype assemblies per year within a very short space of time. We can achieve this due to the wide range of standard components and our own specialised prototype team.

Fast Prototyping

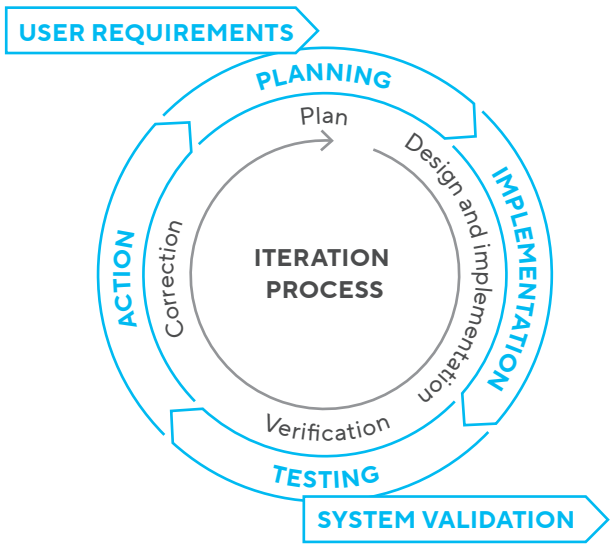
- Materialisation
- Assembly
- Optical inspection
- Initial sample test report

SOFTWARE ENGINEERING

In addition to the actual basic functionality, there are other aspects to embedded software, such as GUI, cybersecurity, compliance, etc. The specialists required for this and the ever-shorter innovation cycles require parallelisation and cooperation across varying disciplines. Our platform approach allows us to develop and test in parallel. Tried-and-tested modular elements and automated tests can significantly reduce throughput times. A sound software architecture and efficient tools are prerequisites for reliable, easy-to-maintain and well-documented software.

Functionality maintenance

- Software design
- Coding guidelines
- Continuous integration
- Build system
- Unit/integration tests
- Software release
- SW design description
- Design reviews



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VERIFICATION

Commissioning and verification of the prototypes is carried out using the established bottom-up process. Where required, we create and use automated test systems for module and integration tests – agile projects in particular benefit from this. In our well-equipped development laboratory, we can test electronic assemblies directly on the provided devices and systems. This allows the specifications to be pre-validated to a certain extent so that loops can be avoided and the development process sped up. The depth of testing of the supplied software releases is extensive. In combination with a bootloader, they can be used for field tests.

Design qualification

- Manual/automated verification tests
- Test under real conditions
- Test reports

PRE-COMPLIANCE TESTS

Electronic devices and systems must meet certain regulatory requirements depending on the area of application. For electronics, these are generally electrical and functional safety as well as fire safety, EMC and material requirements such as RoHS, REACH, etc. We take these aspects into account accordingly right from the start. This begins with the selection of materials and components. We can use the prototypes to carry out pre-compliance tests such as EMC tests alongside development. This increases design security and prevents unpleasant surprises during approval and market launch.

Pre-compliance tests

- Endurance tests
- Insulation test
- EMC tests alongside development

STANDARDS AND TOOLS

Standards

- EN 61326 (EMC)
- EN 61010 (IND)
- EN 62368 (COM)
- EN 60601 (MED)
- EN 62304 (SW)

Embedded software

- C/C++
- C#
- Python

OS and libraries

- RTOS
- Linux
- PEG+
- EasyGUI

Microcontrollers

- Cortex-M
- Cortex-A

Project management

- Confluence
- Aligned Elements
- Jira
- git/SVN

Engineering tools

- Docker
- CodeChecker
- CMake
- Jenkins

CAD tools

- Altium Designer
- PADS (Mentor)
- Alibre
- CAM 350

Methods

- V-model
- Agile