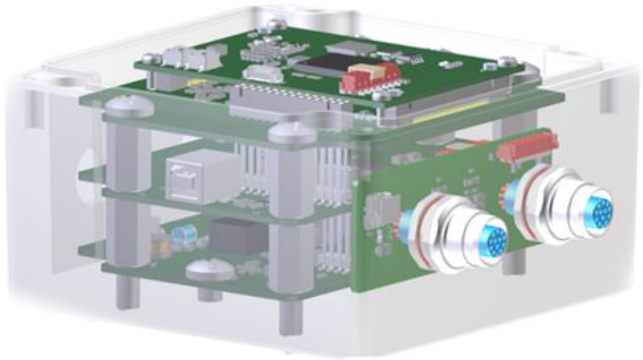
Electronics development

MEMS AG provides competent technical support, accompanies your products from the initial idea through to market introduction and helps you to ensure their technical and commercial success. The systems developed by us meet the requirements from concept to production in the different fields of electronics hardware via firmware to software. Some products developed by MEMS AG were produced in series of several thousand items, and have proven themselves in practical use.

The spectrum for collaboration with MEMS AG is wide. An interdisciplinary team of specialists in the fields of sensor technology, mechanical engineering and electronics is at your service. The outcome of a project with us does not necessarily have to be a working model, prototype or serial product. We can also conduct feasibility studies for your, evaluate components or perform a competitive analysis. You are welcome to approach us for a second opinion, and we will gladly examine your concept, hardware and software.



MEMS AG is involved in several organizations, works with different universities or research institutes and maintains a network of partner companies for the production in the fields of manufacture and assembly of PCBs, EMC-measurements, testing, approval and certification.

Offer

Embedded systems. Development with various microcontrollers and signal processors as well as FPGAs.

Low power systems. Optimisation of energy use and power consumption.

Hardware. PCB design in Altium Designer. Development of prototypes to serial production.

Software. Test software and GUI design. We work with, C#, C++ and LabVIEW.

Firmware. Drivers, measurement and evaluation algorithms. We create certified firmware also in VHDL.

Analog electronics. Data recording and output of signals. We have precise measuring equipment on site.

Power electronics. Power supplies, motor control and control of power semiconductors.

PLC. Power Line Communication for low and medium voltage networks.

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Prototyping

The key to success in prototyping is the use of a suitable development environment and experience gained over many years. MEMS AG uses the Altium Designer EDA[1] software in the development of electronic systems for the generation of the production data of printed circuit boards.

With this software, even complex printed circuit boards - for example with impedance-controlled and lengthwise adjusted lines - can be created. Thanks to archived libraries and models, several partial systems can be combined with each other and integrated into the mechanical system or the related housing.

Altium Designer also offers the ability to import data sets of other EDA tools and export them again, so that they can be maintained using other programs.

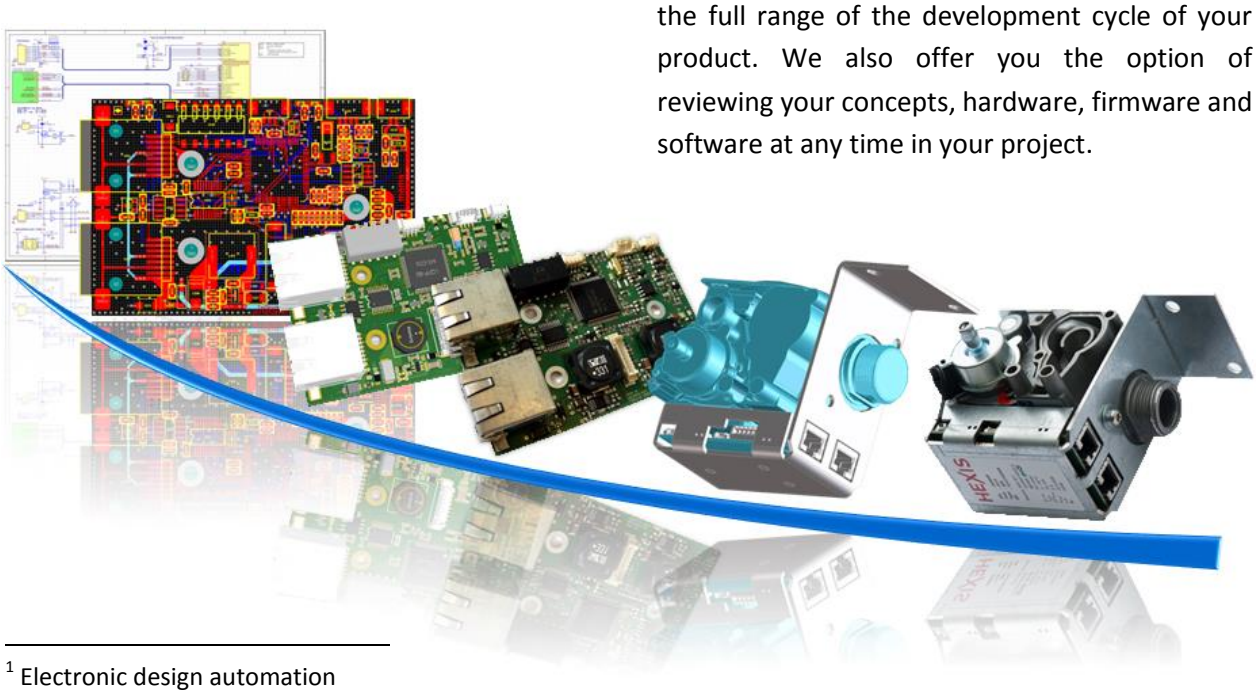
Serial products

The combination of mechanical CAD and EDA software makes it possible to proceed from a prototype to the production-ready product. Our experience extends not only to product development but also to their certification.

Explosion protection or electromagnetic compatibility are other issues with which we deal in depth already in the early stages of the product development.

The sequence of images below shows step-by-step our work on a successful project with Hexis, where we collaborated successfully and decisively on the diagram, layout, testing of hardware and firmware, installation in the final housing as well as calibration with gas in our laboratory.

The team of MEMS AG is at your service to advise and technically assist you with our know-how in the full range of the development cycle of your product. We also offer you the option of reviewing your concepts, hardware, firmware and software at any time in your project.



[1] Electronic design automation

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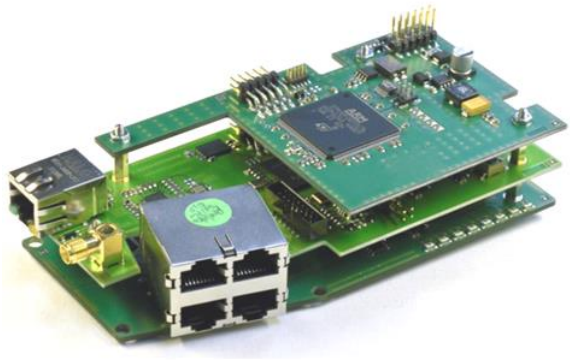
Embedded systems

MEMS AG has extensive experience from the development of simple products to very complex multi-processor embedded systems. We work with micro-controllers and DSPs from different manufacturers, with different characteristics as far as computing performance, power consumption, peripherals and model size are concerned. Upon request, we will gladly provide a detailed list of the computer units used by us so far.



In most projects, we do not use prefabricated evaluation kits of chip manufacturers, instead we develop the hardware platform specifically according to the requirements of our customers. Hardware, software, peripherals and interfaces vary depending on the starting position.

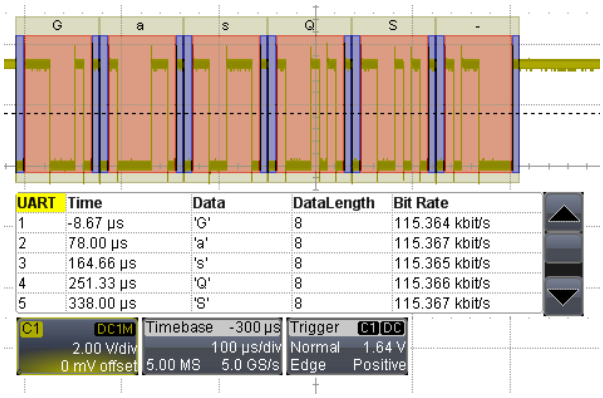
The picture above shows a multiprocessor system developed by us in three tiers due to its intended integration in the final housing. Our staff place great emphasis on cooperation and communication within the team and with you, our customer. Functionality, reliability, time and materials as well as costs depend greatly on it.

Interfaces

As a rule, all electronics require suitable interfaces for the exchange of information within the system. MEMS AG is your specialist project partner for individually adapted interfaces.

Via analog or digital channels, either cabled or wireless, systems are connected, one-directionally or bi-directionally, with each other or to superordinate systems. RS232, RS485, 4-20mA, USB, Ethernet, I^2C, SPI, ISM, Bluetooth, Wi-Fi and CAN are just a few of the standards which we have effectively implemented in our projects.

Quite frequently the question arises, what type of data exchanged is best used. This question cannot be answered in general and is directly related to the available sensors, computing and output units. We will gladly evaluate components for you or help you in implementing the connection. As shown in the screen shot of the oscilloscope below, we also have measuring equipment to evaluate logs.



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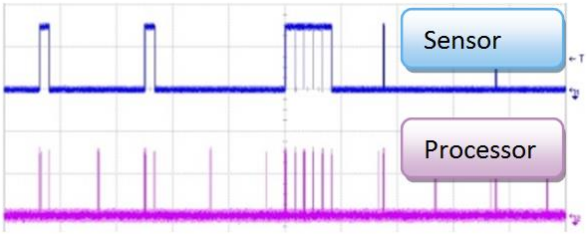
Low power systems

We have developed various low power systems with optimized power consumption or energy use. In past projects, we have already achieved battery lifespans of more than 16 years. We were also able to successfully employ energy harvesting to directly provide systems with sensor signals.

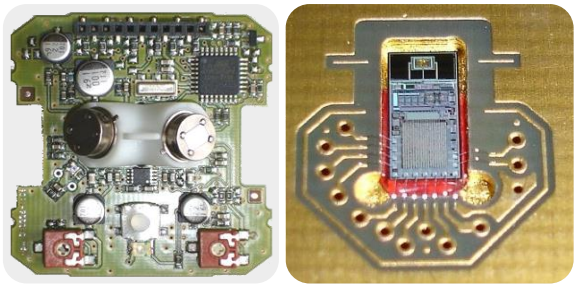


Based on an oscilloscope reading, the top image shows how a processor programmed by us specifically alternates between sleep mode and active data processing. When developing a system, it is essential to monitor the residual charge. Accordingly, we were also able to achieve a battery lifespan of 10 years for the three AA cells of type Li/FeS in the motion detector shown below.

Our know-how in the careful selection of components, the integration of low power modes in the algorithms and the co-design of hardware and software are a real advantage in developing your electronics.

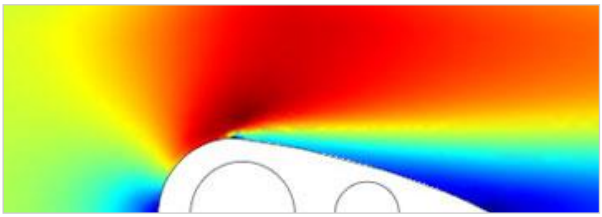
Sensors

At MEMS AG, we use microsystems as well as conventional sensors for the various measuring assignments. Here are two examples from our projects: Bottom left, an electronic system designed by us with passive-infrared sensors, and next to it, on the right, a micro-thermal CMOS sensor, which forms the core of the electronic domestic gas meter developed by us.



One of the major strengths of MEMS AG is our profound knowledge of the physical background of sensors. This consideration leads to a clear added value in the development of systems, since, after all, the measured values must not only be expressed but also interpreted.

To test and optimize systems, we also specifically use simulations. The CFD simulation illustrated below shows the speed field around a flow sensor.



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