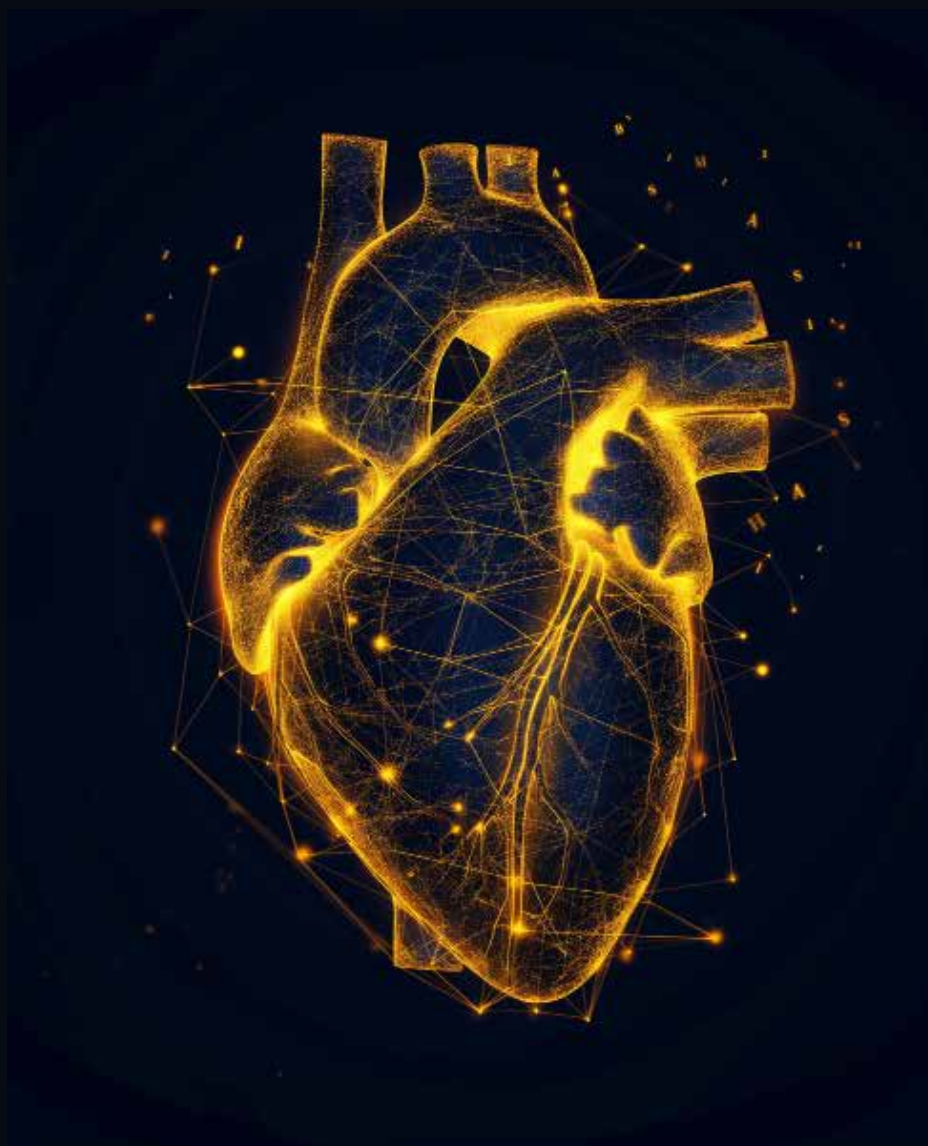




THE HEART OF EMBEDDED VISION

THE VISIONEER

A short story about the heart and embedded electronics

Life as a service provider:
Interview with Oliver Helzle

Embedded vision for defence and military technology



Dear Readers

Embedded vision electronics usually perform their valuable service in secret, often for decades. They collect data from cameras, sensors and actuators in real time and make them available to other functional units. They ensure that the data circulates, they regulate the overall system and keep it alive—in the truest sense of the word. And when we think of driver assistance systems, all-round visibility solutions and electronics for situational awareness, they often operate in safety-critical applications that determine the success of a mission.

No heart, no life—The Heart of Embedded Vision: This is the motto under which this magazine shows you what we care about when it comes to our and your electronics. From a very personal view onto the topic, to the who-we-are and what-we-do to ensure that our electronics become the heart of your applications. We take you with us on a journey, from the selection of components in the earliest design phase to production and partnership throughout the entire life cycle. And we'll show you what we do differently.

There's another thing that heart and electronics have in common: you should rely on an expert for a long and healthy life of both. So choose well and rely on expertise and trust.

My team and I look forward to introducing you to hema electronic and accompanying you and your projects as partners. Let's talk about your wishes and ideas.

See you soon and best regards—from the heart!

Oliver Helzle

Oliver Helzle
Managing Director
and the hema visioneers

3 questions to ...



Jan

Lead Project Manager

What is your internal role in the hema team?

I am Lead Project Manager at hema and responsible for various customer projects in the field of embedded vision. I develop customer-specific embedded vision platforms in collaboration with various teams from hardware, software and FPGA development. I am the technical contact person for the customer, coordinate requirements and accompany the entire project cycle from the initial idea to volume production.

What have you introduced at hema?

A new platform for project management and information exchange. Transparency and predictability are important to me and form the basis for good and efficient collaboration. Here, colleagues from different areas and departments work together on the successful implementation of complex projects and common goals.

Who is a visionary for you?

For me, you are a visionary if you have curiosity and enthusiasm for innovative solutions in the field of embedded vision and if you enjoy implementing them.



Gabriele

Human Resources Manager

What did you introduce at hema?

A new HR management software. It replaces our previous time recording system and enables efficient HR management. What's new? The digital personnel file with document management and digital signature, workflows for recurring processes such as the onboarding of new employees, creation of reports and analyses on key personnel figures. It also comes with a mobile app.

Working at hema means...

It never gets boring, the tasks are varied. I have a lot of freedom and can help shape things, and I can look forward to my beautiful office and my nice colleagues every day.

Who is a visionary for you, and why?

Someone who lives our hema values, never stops developing, is open to new things, thinks outside the box and contributes to making the hema vision a reality with his or her work.



Bianca

Specialist for SMD

What is your internal role in the hema team?

I work together with my colleague Maria on every task related to SMD. Starting with creating the programs for the pick-and-place machine based on the CAD data from development. This also includes adding new components, picking orders and setting up and operating the placement machine. Working on the stencil printer and AOI device is also part

of the job, as is creating the programs for them. After soldering the circuit boards in the reflow oven, We check them under the microscope and may rework them if necessary.

How do others at hema see you?

I think I am perceived as a positive person. Helpful, motivated and always up for a bit of fun.

As a visioneer on the road, what do you take with you on every trip?

Good shoes and comfortable clothes, because I love walking and cycling. Good music is also a must, of course.

Dennis

Operations Manager

Working at hema means...

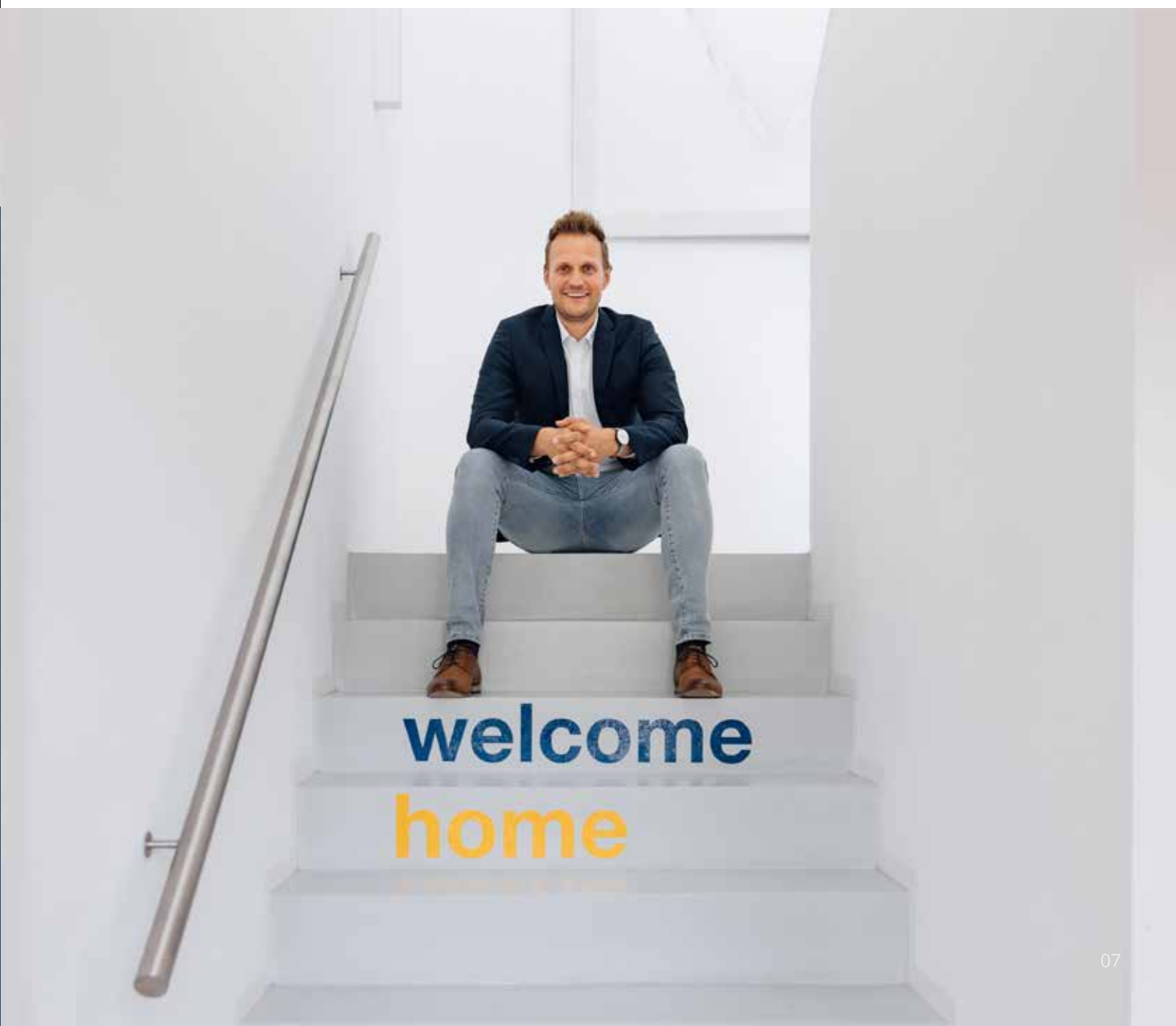
Working with a great team every day to support our customers with innovative solutions and to achieve their goals.

What did you introduce at hema?

In my many years at hema, I have of course experienced a lot of great things. We have integrated new processes and improvements with the visioneers that have brought real added value to our customers. I'm very proud of that.

As a visioneer on the road, what do you take with you on every trip?

In fact, I always have a book with me, on topics related to hema and my personal development.



THE HEART

OF EMBEDDED VISION

A little story about the heart and embedded electronics

Alongside the brain, the heart is probably one of the central organs of all living beings. It is scarcely imaginable what it means when the heart is not beating. From the first heartbeat to the last, it means life. Being alive. The work and performance we achieve is directly connected to this. Whether animal, human or in our context as the “heart” of a technical system.

So where does the heart of embedded electronics beat? Put simply, we see a system in the context of video electronics as follows: We have a lot of sensors, that we put out into our environment, and we have receivers that we supply with sensor data, i.e. the information about our environment. These can be people and machines. Between the sensors and the receivers, we need two essential elements. Firstly, a machine that processes the data, i.e. the heart, and secondly a brain, that uses the appropriate intelligence to extract the information from the data. The information will only then be passed on successfully to the recipients. Properly designed, the heart and brain form a powerful combination and technically sophisticated solution.

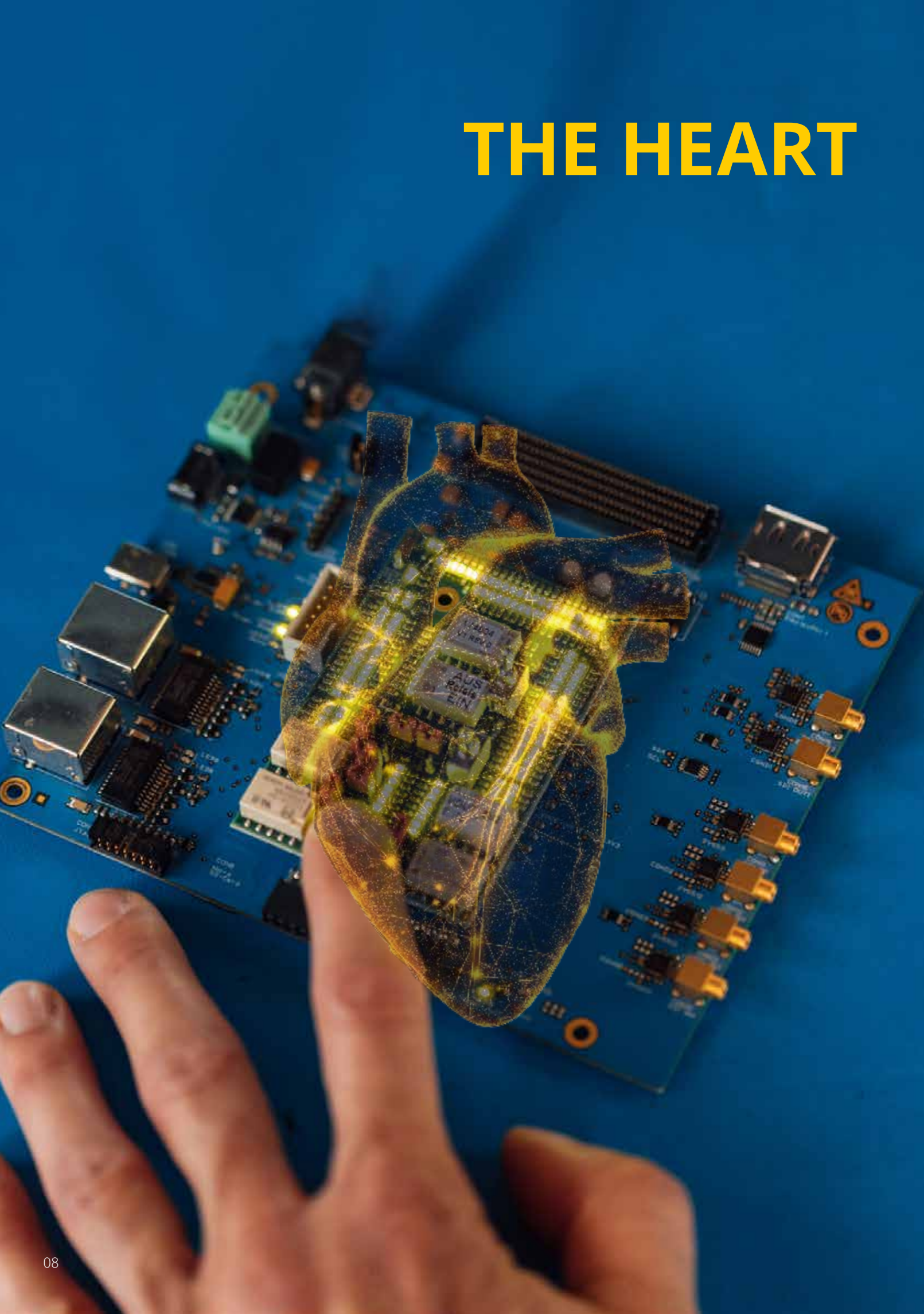
What is the role of the heart in this system? We define four functions: The first is to transport the data inside the system. This means receiving the data from the sensors and forwarding it to the recipients via the appropriate channels, networks and lines. Special cases of this are real-time streaming, i.e. the low-latency transmission of data for real-time applications. Secondly, the various sensor data must be synchronized with each other and also distributed further. Thirdly, this data often needs to be processed due to its characteristics. This includes image processing, image enhancement or the insertion of information in the image, known as graphic overlay. Fourthly, the data can be prepared in appropriate formats for intelligent evaluation, i.e. the tasks of the brain. After processing in the brain, by standard algorithms and artificial intelligence, the data is then returned to be forwarded to the appropriate recipients.

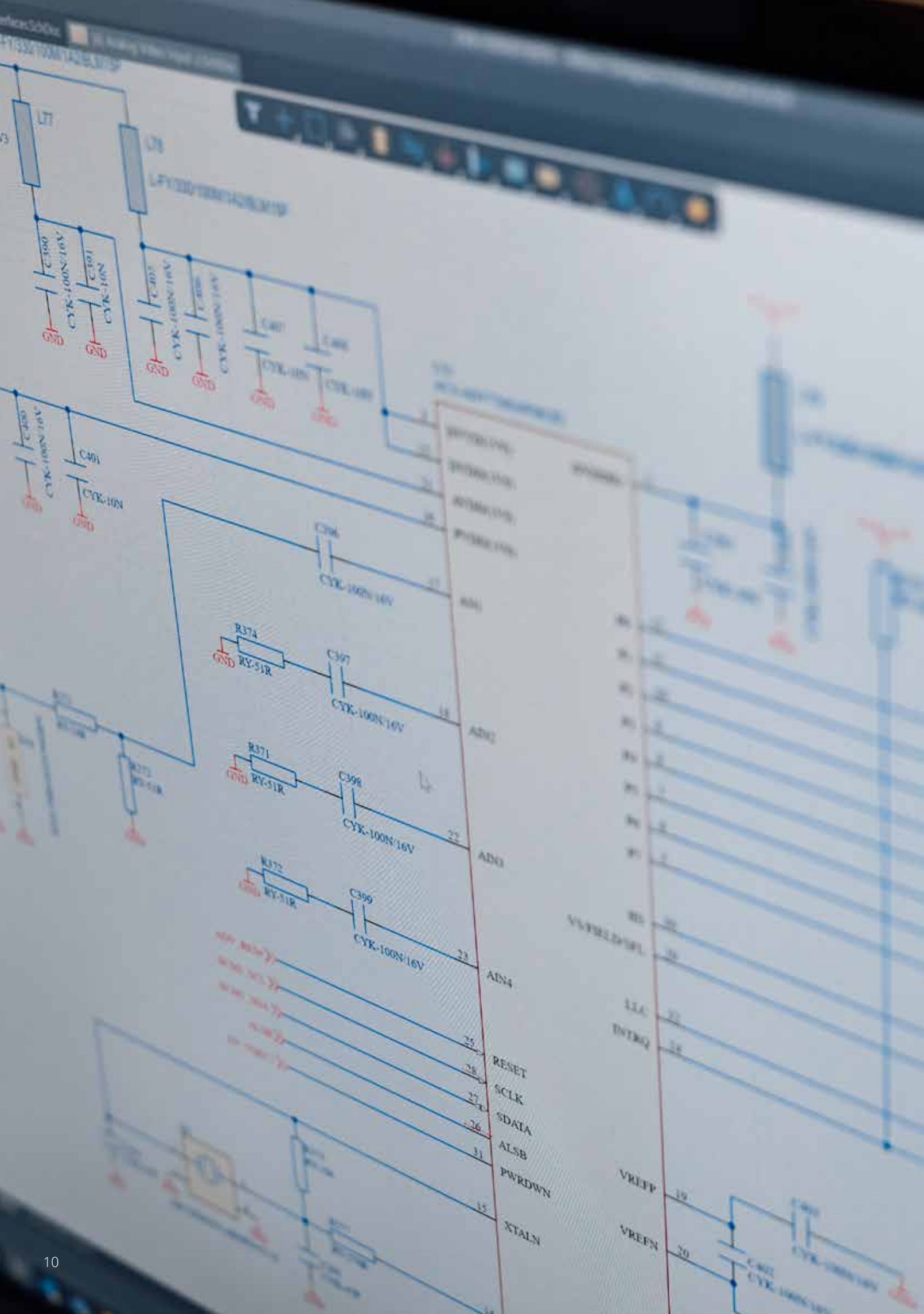
Every living creature has its own characteristics and skills. Small animals are built differently to large animals. Accordingly, they have large and small hearts or larger and smaller brains, depending entirely on their way of life, their environment and their habits, usually perfectly adapted to them. We see the question of the architecture of electronic systems in the same way: Depending on the task, the system needs to be equipped with suitable capabilities. A small system is different to a large one, a simpler one is different to a highly complex one, a system with the highest speed requirements is different to one for complex computing tasks; last but not least, a mobile device is different to a stationary machine. These usage and application scenarios have a considerable influence on our “organism” and its heart.

What does your application look like — and what is the right „heart“ for it? I look forward to hearing your ideas and to a joint brainstorming session, if you like. Let's bring your system to life together.

Feel free to write to me or give me a call.

Yours, Oliver Helzle





news & Trends

FPGA + GPU

AI is a catalyst for technological progress. hema has embraced the trend, and is researching on a hybrid platform for embedded vision applications with classic algorithms and AI.

Author: Dr. Tony Albrecht, Head of Development, hema electronic GmbH

Autonomous systems, robots and collaboration between humans and machines are placing new demands on machine vision applications. As soon as the devices move autonomously on the factory floor, the safety of operating personnel or passers-by depends on the integrated vision systems and their additional sensors. The electronics must therefore be able to recognize and track people and objects with maximum precision and reliability. Artificial intelligence has proven to be an effective means of improving the accuracy and efficiency of detecting objects and people, which in turn places its own demands on the electronics for data processing.

Advantages of FPGA and GPU combined

Up to now, systems based on CPUs (Central Processing Units), GPUs (Graphical Processing Units) and FPGAs (Field Programmable Gate Arrays) have been used for such electronics. CPUs are characterized by their free programmability, while GPUs, with their ability to process large amounts of data and complex algorithms in

parallel, are particularly suitable for training AI models. They also offer good performance in inference, i.e. the application of trained models with new data, but often reach their limits with very specific requirements and in real-time applications. This is precisely where FPGAs play to their strengths: They can be flexibly configured and optimized for specific tasks. This enables faster data processing with higher energy efficiency.

Research project for hybrid embedded vision systems

In order to make optimum use of the advantages of the respective architectures, hema electronic is testing and evaluating a hybrid architecture for an embedded vision system. FPGAs are to be used for flexibly configurable tasks, while AI processing is to be handled by a GPU. This combination promises the development of energy-efficient and cost-effective solutions that enable real-time data processing, fast and precise decisions and reliability for use in safety-critical areas, using both classic algorithms and artificial intelligence.

The Challenge: Partitioning between FPGA and GPU

A key component and challenge in the technological implementation of the system is efficient partitioning between the FPGA and GPU. To this end, hema is testing methods and tools such as TensorFlow Lite for model conversion and manufacturer-specific frameworks for implementation. An application example for model development is a camera system that could be installed on self-driving vehicles in intralogistics and detects people, obstacles and objects.

The FPGA is optimized for processing the raw video signal data in order to meet real-time requirements and minimize latency.

The GPU then takes over the complex image processing tasks, but with a significantly smaller amount of data thanks to the pre-processing in the FPGA. In combination, this should result in a significant speed advantage.

Modular design reduces development time and costs

On the hardware side, the hybrid architecture is implemented using the modular hema embedded vision platform and several system on modules. This results in numerous advantages, also with regard to later customer projects: Modular electronics for the main board enable the fast and cost-effective development of individual systems. Interfaces and functionalities can be configured from an existing modular system of layout blocks and circuits and supplemented with your own or new circuit components. The building blocks are tested and proven. This reduces development time and minimizes design risks.

Several system on modules perfectly combined

System on modules ensure the computing power of the system. Here, hema makes a distinction between FPGA modules and GPU modules: The FPGA module forms the core for pre-processing the signal data in real time and for sensor management; the separate GPU module is responsible for the AI-based detection and analysis of people and objects. The combination of separate SoMs with FPGA and GPU enables precise scaling of the required computing power as well as simple upgrades or product variants in the life cycle of the end applications.

Optimized signal processing within the system

Additional functional units that perform special functions and tasks are integrated to ensure the efficient distribution of data streams and the seamless cooperation of all electronic components: A video signal processing unit ensures that all sensor data is optimally transmitted within the system and is available to the respective processes in the adequate format and quality. This unit is supported by FPGA and GPU. A partitioning unit for the AI model distributes the AI models to the respective computing units

and thus ensures maximum utilization of the available resources. This system integration module continuously monitors the correct integration of hardware and software architecture and the merging of all components.

Roadmap and development steps

The project is currently in the design phase, but already draws on hema electronic's extensive experience. hema has developed numerous systems that combine several system on modules for optimized signal data processing in multi-camera and multi-sensor systems. They are used in professional series products, including in the defense industry, where the highest demands are placed on reliability and minimal latency.

Activities are currently focusing on the development of a hardware concept in which FPGA modules and GPU modules are integrated, as well as on the necessary configuration of interfaces, the optimization of internal signal processing and efficient data distribution. The necessary software is developed in parallel, particularly with regard to the optimization of memory requirements and computing power for use in an embedded system.

System design transferable to other industries

The project aims to show that a combination of FPGA- and GPU-based computing units in an electronic design increases the efficiency of data processing and enables optimal utilization of the respective advantages. At the same time, these embedded vision systems are characterized by their energy efficiency and compact design. In conjunction with the modular design of hardware and software and comprehensive scalability through the integration of various system on modules with FPGAs and GPUs, this also results in shorter development times to series production and cost benefits for the entire life cycle of the projects. While the recognition of people and objects is a common use case for such electronics, the technology should also be generally transferable to other applications in which real-time requirements, low latency and the use of AI models are possible and in demand.

hema on the road



IDEX & NAVDEX, Abu Dhabi
17.02. – 21.02.2025

ENFORCE TAC, Nuremberg
24.02. – 26.02.2025

embedded world, Nuremberg
11.03. - 13.03.2025

ASDA, Zagreb
08.04. – 10.04.2025

DEFEA, Athens
06.05. - 08.05.2025

FEINDEF, Madrid
12.05. - 14.05.2025

AFCEA, Bonn
27.05. - 28.05.2025

DALO Industry Days, Copenhagen
27.08. - 28.08.2025

MSPO, Kielce
02.09. - 05.09.2025

RÜ.NET, Koblenz
03.09. - 04.09.2025

DSEI, London
09.09. - 12.09.2025

Space Tech Expo, Bremen
18.11. - 20.11.2025

NEDS, Rotterdam
18.11. - 20.11.2025



Welcome to our production department

This series is all about your product, and about its journey from idea to market success.

In THE VISIONEER 01, we introduced you to the development team. From there, the path leads just one floor down to production. Both departments are therefore literally "under one roof", with decisive advantages for your project.



Christoph Becker
Head of Production

Development and production: Working together for your product

A circuit diagram has been created from your idea and the first prototype has been ordered? Then production already knows your project! As early as in the design and development stage, production checks production capability and risks in terms of component availability and long-term procurement. Possible layout optimizations are also worked out here, which can be used to reduce work and therefore costs in volume production. This close exchange is part of the coordination between development and production.

Tools for obsolescence management and maximum long-term availability

In development, purchasing and production, we work with state-of-the-art tools such as Luminovo as a platform for the supply chain. This gives us and you a comprehensive overview of the RoHS and REACH conformity of the selected components, availability and lifecycle risks. You can read all the details in the article on obsolescence management on pages 28-31.

Processes for maximum production reliability

Once the prototype has been comprehensively tested and approved for production, the production processes begin: Material with long delivery times is ordered as early as possible, additional material is purchased to suit the planned production dates and production documents are created. They include prepared CAD and placement data as well as images and instructions for production. At the same time, an FMEA analysis is carried out during prototype production, which identifies possible risks and influencing factors during production and leads to the development of preventative solutions. This analysis is part of our store floor management, which we see as a holistic approach for all production processes: It includes the Continuous Improvement Process (CIP) with the aim of maximally efficient and sustainable production aligned with lean management criteria.

Material warehouse and traceability

Our material warehouse is batch-managed and fully digitized. Barcodes at storage locations and components as well as double component verification during set-up prevent incorrect stocking and enable traceability down to component level.

State-of-the-art production lines and 100% AOI

For the assembly of your PCBs, for prototypes as well as for later production, we have state-of-the-art machinery for SMD and THT assembly. A brand new addition is our MYPro A40LX pick-and-place SMD line from MYCRONIC, which will be installed in spring 2025 to expand our production capacity for the latest technologies. All production stations from solder paste printing, to placement and vapor phase or reflow soldering, have integrated systems for automated optical inspection (AOI). This ensures the highest possible product quality as well as continuous testing and optimization of the production processes. Following production, PCB cleaning, inspection and functional tests are carried out and, if required, heat sinks are mounted or the components are installed in housings.



What standards does your product require?

Our production is carried out in accordance with the latest soldering standards such as IPC-A-610 (Revision H / Class 3). In addition, hema electronic is certified by numerous manufacturers, including safety-critical systems. Regular internal and external audits ensure the high quality of our production and products, many of which have been in professional volume series for many years and decades.

We will find the right solution for your challenge.

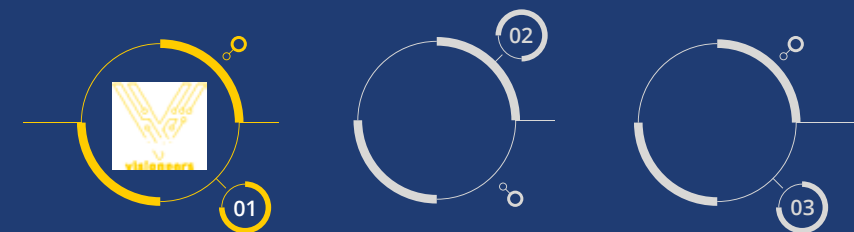
Do you have questions about production, specific requirements or standards? Our team will be happy to help you. Simply send us an email or give us a call.

Email address: c.becker@hema.de
Phone number: +49 7361 94950

3 DIFFE- RENTIA- TORS

HOW WE MAKE THE DIFFERENCE

EMBEDDED VISION EXPERTS



Our customers and partners describe us as embedded vision experts. And yes, the description fits: Since we developed the first products for image processing over 30 years ago, hema electronic has made numerous innovations in embedded vision electronics a series success. Customers such as Hensoldt, Bosch and Daimler use our solutions worldwide, the readers of ELEKTRONIK magazine voted our embedded vision platform „Product of the Year“ and AMD named us AMD Adaptive Computing Partner Premier, as one of only five companies from Germany and as one of

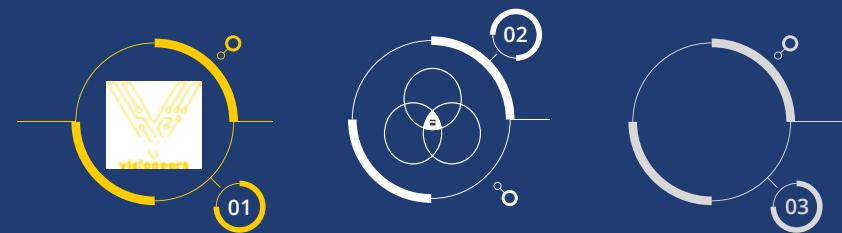
the few developers of mainboards for the AMD Kria platform at the highest partnership level.

Today we proudly say: We are embedded vision experts. And by that we mean: Your experts for embedded vision. Because we bring our knowledge and expertise to your projects — as part of your team and working together on an equal footing.

In which area are you an expert?

Together we will empower you to be the global market leader of tomorrow.

ONE-STOP SOLUTION

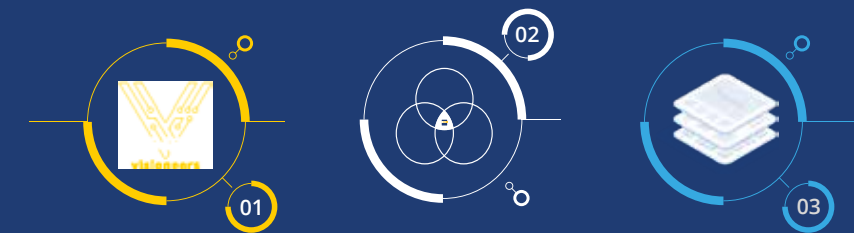


Development – Production – Lifecycle: All of our departments work under one roof at our site in Aalen. This ensures short distances and flexibility, close co-operation and direct coordination between the parties involved. At the same time, we also involve you directly in these processes: With state-of-the-art project management from concept to prototype to series production. Our customer portal gives you an insight into the current status of your projects at all times, informing you of milestones reached, the next steps and any action required.

All important information is displayed here for you and supplements the direct exchange between development, production and the test field.

If you do have any questions, a dedicated contact person is available to you, throughout the entire life cycle of your product. This is because hema's One-Stop Solution includes comprehensive services, from support with hardware and software development to active obsolescence management.

HEMA PLATFORM



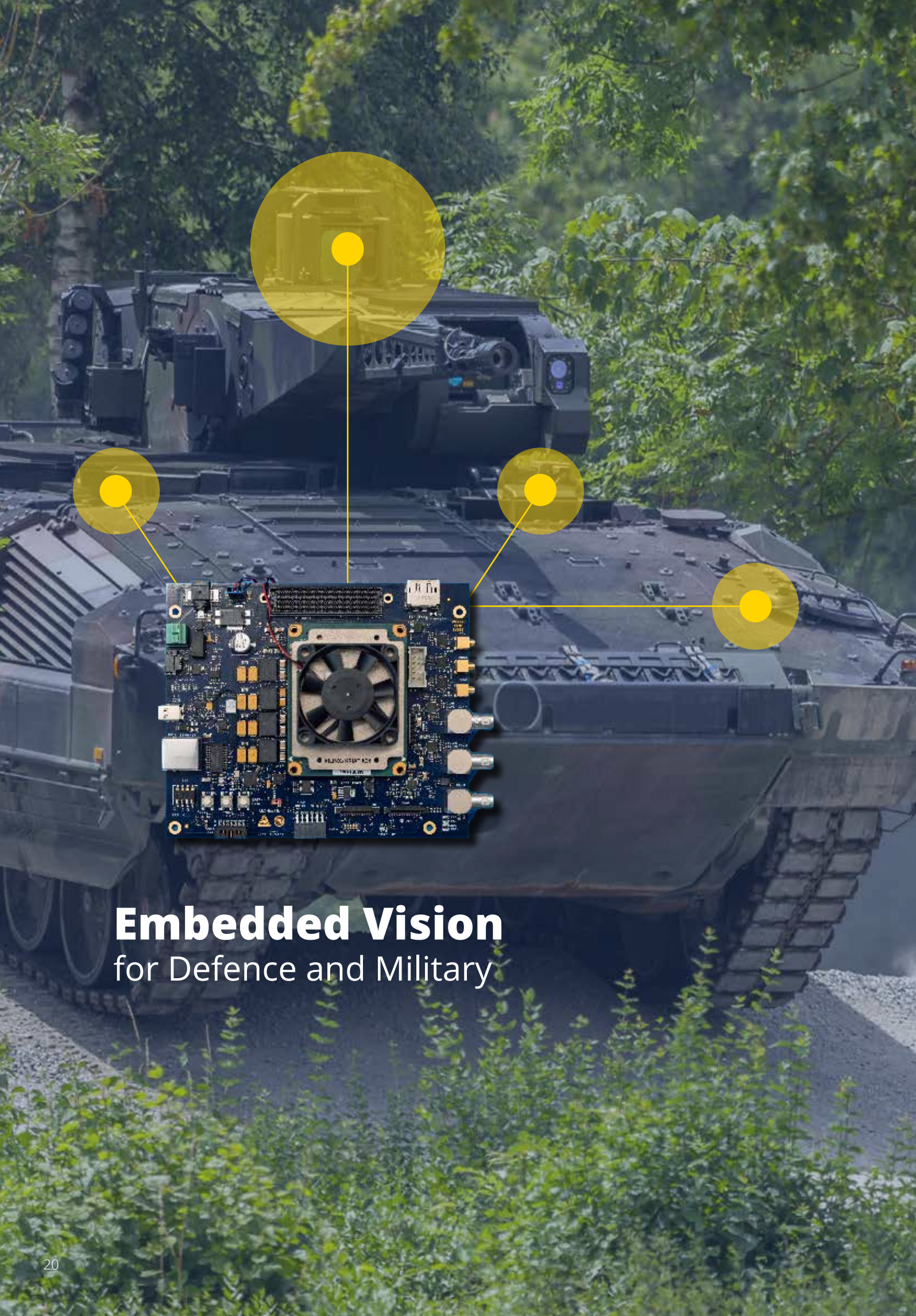
Our services are geared towards highly complex projects, and towards making them a success in the shortest possible time. Our hema embedded vision platform and the Fastlane Boardservice form the basis for this: In our configurator or during a workshop, you define the required specification for your electronics and select one or more system on modules, e.g. from the AMD Kria series, for the computing power. We support you with our expertise, develop the circuit diagram and layout and produce your first prototype, ideally within 30 days.

We use the hema design library with over 45 predefined building blocks. This means you be-

nefit from series-proven circuits and fewer design risks. We also integrate customised circuits and produce your electronics directly on the same lines as the subsequent series production.

„Fastlane“ means that all processes are optimised for prototype production, from layout and design to purchasing and warehousing through to flexible assembly and logistics.

The result of comprehensive preliminary work, the modular principle and Fastlane production: you receive your prototype at the earliest possible time, achieving series production readiness and market success more quickly.



Embedded Vision for Defence and Military



Eyes on the field!

Mission-proven electronics for driver vision and sensor-fusion

Driver Vision Enhancer and Situational Awareness Systems are crucial for safety in military and defence operations. Special electronics for these systems combine data from multiple cameras and other sensors. They ensure, that the right images and data are available to every user at all times. Real-time data processing and ultra-low latency requirements, sensor fusion for 360° all-round view and superimposed on-screen graphics and information have in the past made the development of such electronics time-consuming and expensive. However, this does not have to be the case, say hema electronics. The German vision electronics developer and manufacturer with 45+ years of experience offers a modular embedded vision platform, that shortens development times, reduces costs and minimizes design risks. It is battle-tank approved with over several thousand assemblies in the field and features scalability for upgrades and product variants.

Qualified according to MIL standards

The company recently developed a video distribution unit for a German OEM providers' Driver Vision System, that is being implemented in tracked and wheeled armed vehicles. The development from order placement to the first delivered unit took just 24 months, significantly shortening the time to volume production of the overall solution. The Driver Vision System integrates numerous cameras and sensors

and can be used as a standalone Vision System or as an upgrade to existing DVS. It enables secure operation of the Defence Ground Vehicles under the hatch and can thus substitute standard angle mirrors. There are four different standard versions of the OEM's system available, all based on the same electronics, with different computing units for scalable performance and features. Thanks to the rugged design of the electronics and overall system, it withstands shock and vibration as well as harsh

environmental conditions. The system passed all certifications according to MIL standards and have now started to be deployed in several international armed vehicles.

Design library for costum vision systems

The development of the electronics is based on the hema embedded vision platform, that has been especially designed for embedded vision electronics and applications such as surveillance solutions, situational awareness systems and other stationary or mobile image processing applications. It has been deployed for other military, defence and security applications before, with over 150,000 units already in the field, numerous of them implemented into latest generation battle-tanks.

The design platform is based on over 45 building blocks for interfaces and functionalities, from which the hardware can be freely configured. Developers therefore select the required interfaces from the hema design library. Standard interfaces such as Ethernet, USB, CAN and Wifi / Bluetooth are available, as are common video interfaces.



The board format can be freely selected so that the electronics can be adapted to existing housings. On request, hema can also supply complete solutions including customer-specific housings. In hardware design, there are corresponding templates for the circuit diagram and layout for each of the building blocks. The advantage for the customer: They receive their individual electronics within a very short time and at manageable development costs. In contrast to a completely new development, the electronics are based on tried and tested circuits, perfectly suitable for defence solutions. Customer-specific circuits or functions not yet available in the hema design library can be easily integrated. Longevity and long-term availability is ensured for all components of the system, with proactive lifecycle and obsolescence management and obsolescence management. These services, as well as development and onsite-production, are all provided directly from hema electronic in Aalen, Germany.

FPGA-based modules for scalable performance

The computing power of the electronics is provided by system on modules (SoM) with powerful ARM processors and FPGAs. All EMC-critical components around the processor are already integrated on the modules, which simplifies the development of the mainboard and in turn contributes to lower costs and shorter development times.

The modules are available with different performance classes, processors and memory expansions. A standardized interface ensures compatibility and enables product variants, without the costly redevelopment of the entire electronics and thus perfect for mid-lifecycle upgrades.

The FPGAs on the modules manage the video data: they process the data of the multiple inputs and distribute it to the outputs. All functions are implemented with extremely low latency times of 30ms - 40ms, depending on additional image processing tasks. The processors and FPGAs can also be used to combine video streams into dual and quad view or picture-in-picture data, or to play out graphic overlays via the video outputs. If required, the electronics can also supply finished video data, e.g. for 360° views, which can be stitched together and rectified, or for fusion of day- and night-vision camera data. For this image processing, the electronics include comprehensive software libraries and sample applications, that customers can use as a basis for their own application development.

Modular software design and extensive tools

The software for the FPGA electronics is programmed in parallel to the development of the hardware and is also based on modular building blocks, which are customized and individually adapted to the hardware. hema electronic provides code blocks for certain image processing functionalities such as split screen, picture-in-picture, scaling, mirroring, rotating and graphic overlays. This speeds up development and reduces the risk of programming errors. Code blocks for the latest AI chips such as the NVIDIA Jetson series, the Hailo Edge AI processors and the SimAI deep learning tools from Ansys are also integrated into the software library.

Fast implementation of versatile optronic systems

The modular software development process is fully integrated into the digital production workflow of the hema electronics platform. As a result, customers receive within weeks customized prototypes that allow to develop, implement and test their own applications quickly and easily. Thanks to tried-and-tested, industrial-grade circuits and components, hema's prototypes are already very close to the subsequent series hardware. Series optimization, certifications and the start of production can take place in just a few weeks. The hema embedded vision platform is thus the ideal basis for the fast and cost-efficient development of video processing units and other electronics for sensor data processing in numerous military and defence applications, as well as civil use-cases for surveillance and other embedded vision tasks.

35 YEARS OF EXPERIENCE IN NEURAL NETWORKS AND AI

FIRST HIT RATE IN CIRCUIT BOARD DESIGN:
OVER 95%

DID YOU KNOW THAT A CIRCUIT BOARD CONTAINS
APPROX. 3,574 CM OF CONDUCTOR TRACKS?

150.000
ASSEMBLIES IN
THE FIELD

20 DEVELOPMENT PROJECTS PER YEAR

THE OLDEST PRODUCT THAT HEMA STILL
PRODUCES IN QUANTITY IS **33 YEARS** OLD

Life as a service provider: an interview with Oliver Helzle



Oliver, hema electronic sees itself as a “development house and service provider in the electronics industry”. What does that mean for you in detail?

Our customers usually have clear ideas and requirements for a project. The “how it’s done” is usually open and they rely on the hema visioners to implement it. That’s exactly what we do: we are the embedded vision experts. What makes us special is that we support our customers in development, production and with services for the entire life cycle. Always tailored precisely to what the respective customer needs and what they may want to do themselves.

„For us, being a development house means that we make our customers’ projects a success. We don’t have our own products and don’t plan to; this is our strategic positioning and DNA as a technology partner.”

How does the hema embedded vision platform fit in with this?

There are ready-made products for many requirements. We ensure that customers with a need for customization and special requirements can also find a suitable solution. The hema embedded vision platform helps us to implement these solutions economically and quickly, with reduced design risks thanks to tried and tested circuit components. Customers who find part of their requirements in our design library and also want to integrate individual, new functionalities are usually a good fit for us. This is where we can perfectly contribute with our know-how.

Do the customers’ special functionalities then end up in the hema design library?

As a rule of thumb, customers benefit to over 70 percent from the existing standard circuits in our design library. New building blocks that we develop for customers can become part of the design library, but they don’t have to. For many customers, it is precisely these functions that give them a competitive advantage and which we then do not use for other customer projects. We sign appropriate contracts for this.

Today, EMS companies that used to be pure ,contract manufacturers’ also offer development services. How does hema differ from them?

We are first and foremost developers and have our own production facilities so that we can meet the high demands of our customers and offer development and production from a single source—not the other way around. What’s more, we are experts in embedded vision and FPGA technology. We take on projects in which customers benefit from precisely this know-how and our experience. Our production is exclusively for our project customers. We do not take on any production orders if we are not also significantly involved in the development.

We are experts in embedded vision and FPGA technology. We take on projects in which customers benefit from precisely this know-how and our experience.

What are the technical requirements that customers come to hema with?

We usually develop medium to highly complex systems for our customers. They often involve numerous cameras—up to 20 or more—as well as other sensors that need to be integrated. Added to this are requirements such as ultra-low latency and real-time image processing, graphic overlays, fusion of sensor data and other complex algorithms. However, some customers also come to us because they are specifically looking for an embedded vision expert who can implement projects with Zynq UltraScale Plus processors or other powerful FPGA-based system on modules. Requirements such as use in safety-critical applications, in vehicles or harsh environmental conditions, which place high demands on robustness and reliability, often also play a role. We can provide convincing solutions and references for all these applications.

“Faster time to market” is a frequent goal in electronics development. How does hema view this topic?

Basically, we see two trends: innovators want to be on the market with new technologies as early as possible, before the competition. At the same time, systems should often be in use for many years or decades, but also allow upgrades to integrate new functions. We can offer a solution for both trends: With our hema embedded vision platform, customers can get straight into testing and software development while we develop a prototype of their individual hardware for them. To this end, we have defined processes with which we parallelize the development of hardware and software.

„We call this Fastlane Design Service: it enables a fast time to series qualification, even for complex projects“

The second requirement, upgrades during the life cycle, is made possible by modular design. This means, for example, that product series can be designed with an identical mainboard that is delivered with a different system on module depending on the desired performance and equipment or for upgrades. This is a key advantage of modular design: even if further development is required to adapt

the existing electronics, the cost of this and the subsequent testing and certification is significantly lower than the cost of a completely new development. A new FPGA chip with more computing power, new interfaces or an adapted circuit board format can usually be implemented quickly and at a manageable cost. In other words, development with hema is not a dead end. This partnership in the life cycle is an important part of our work and how we see ourselves.

What role does AI play at hema?

AI is currently on everyone's lips and is also used in many of our departments, from image generation in marketing to the optimization of production planning. We are also working on this topic for customer projects, for example by combining the respective advantages of FPGAs and GPUs (see "News & Trends" p. 10).

Neural networks and their use in image processing have also been known for a long time. For us, the current AI trend is a logical evolution of the topic.

When used in projects, artificial intelligence initially requires a lot of video data. Our platform offers the necessary prerequisites for bringing together precisely this data so that an AI can work efficiently. In short, customers who are developing an AI application are in good hands with hema: We develop the right electronics to collect and process the data for it.

Let's take a look at the current year. What are your expectations for the industry and for hema in particular?

„I'm very positive about the year and the future in general, even if the economic situation brings insecurity and a lack of planning certainty“

Our customers generally develop long-term, durable products. We are therefore not as dependent on short-term fluctuations in the market as developers and manufacturers of consumer electronics. Our position as an owner-managed family business, free from investors, provides additional security here, both for customers and for our employees.

At the same time, we are currently investing heavily in our own further development: we are looking for engineers for hardware and software development to strengthen our team, we are training our employees and we are expanding our machinery, including a new assembly line that will double our production capacity from the current 14,000 assemblies per year to 28,000 assemblies per year. This will provide our customers with secure prospects and reliable supplies, even if demand increases. We are also implementing new IT and digitalization projects to improve our processes.

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And in terms of technology, what news can we expect from hema?

Our technology roadmap is being consistently implemented and further developed: We are currently working on solutions with an even smaller form factor, higher energy efficiency and heat resistance. Another topic is the integration of FPGAs and GPUs into even more powerful overall systems and we are observing the "technology race" between Intel, ARM, Nvidia and other companies. From this, we define suitable and realistic implementations for embedded vision applications for our customers and ourselves.

Our goal is operational excellence, in other words to become even better at what we do, and to optimize our processes and our offering. I can promise: there's a lot more to come from hema in the near future!



hema visioneers award

The hema visioneers award was presented for the first time in 2024 as part of the embedded world Exhibition & Conference. Daniel Schick received the award, endowed with 500 euros, for his bachelor's thesis on "Control Application with Autonomous IP-Core Detection for Xilinx SoCs Running Linux" in the Department of Applied Computer Science at Fulda University of Applied Sciences. Representatives from several universities and the partner AMD attended the award ceremony.

The aim of the hema visioneers award is to provide support and attention to young talent in the STEM field. In doing so, hema electronic also focuses on its own core competencies and offers the award for final theses on the topics of embedded vision and FPGA technology.

Oliver Helzle, Managing Director of hema electronic, said at the award ceremony with representatives from several universities and the partner company AMD: "The hema visioneers award began with the idea and conviction that outstanding performance in the field of FPGA & embedded systems among students must

be recognized and appreciated. It is important to us as a company to make a contribution to young people, to highlight their work and to create many generations of hema visioneers award winners. Tonight we can proudly say that this mission has come to life and is reflected in the exceptional achievements."

The hema visioneers award will be reopened for theses written at universities in Germany, Austria and Switzerland in 2025. A total of 1,200 euros in cash prizes and extensive funding will be awarded; the special "Woman in Technology" prize recognizes special achievements by female students and engineers. As an AMD Adaptive Computing Partner Premier, hema electronic works closely with AMD and other partners for the hema visioneers award.



Further information about the award



30+ years of product availability: obsolescence management for the entire product life cycle

Ever faster technological developments are resulting in shorter innovation and life cycles for products and components. This does not stop at industry and is becoming a real challenge for sectors such as medical technology and the defense industry, where systems are expected to be available for 30 years or more. hema electronic has tailored its obsolescence management specifically to the requirements of such applications. It ranges from the design phase and product development to series qualification and extensive measures throughout the entire life cycle of a product. The result is long-term and reliable availability of assemblies and products. The risk of expensive and time-consuming emergency measures is reduced, meaning that obsolescence management also increases profitability. Each customer can individually define their specific needs and the structure of the service.

What exactly is obsolescence management and why is it becoming increasingly important?

Obsolescence management refers to the strategic planning and implementation of measures to ensure the availability of components, materials and technologies over the entire product life cycle. The aim is to minimize risks caused by components that are no longer available and at the same time to optimize profitability.

The main causes of obsolescence and the challenge for long-lasting products are the rapid development and production of new generations of components. These are often characterized by better functionality, new technologies or a smaller form factor. As a result, they replace their predecessors for new developments and are often no longer produced by the manufacturer, in order to increase profitability and to make optimum use of resources for production. Other causes include regulatory changes, which can lead to the adaptation of materials or production methods, or the discontinuation of production due to the insolvency of a supplier without a second source.

What to do in the event of product discontinuation?

If a manufacturer plans to discontinue a component series, a product change notification is usually sent to customers. These often already contain a reference to a successor product. For many series products, especially in the consumer sector, the impact is limited: If a component is identical in form, fit and function, it can simply replace the discontinued component. In other cases, software adjustments are necessary or, in the

worst case, an adjustment to the design of the product. If the end product is designed for a rather short product life cycle anyway, the redesign can simply be taken into account for the next iteration or product generation.

Obsolescence in medical technology, the defense sector and other industries with long product life cycles

Obsolescence management is much more complex for components of industrial plants and systems, which should ideally be produced over many years and with as few changes and adjustments as possible. In industries such as military and defense technology and medical products, there are also regulatory requirements that can necessitate extensive testing and cost-intensive recertification in the event of a component change. The aim of obsolescence management for these products is to avoid changes wherever possible.

Long-term availability as a design feature

This is precisely where hema electronic's obsolescence management comes in: As early as the design and prototype phase, we check the lifecycle risks of components. We work with state-of-the-art software tools such as Luminovo for supply chain management in development and purchasing. The result: even the first hardware prototypes are based on components that are selected for maximum long-term availability and low risk of changes or discontinuation. These near-series prototypes are also produced on the same production line as the later series products, enabling comprehensive evaluation of product and production quality.

Individual services for procurement management

During the series qualification of electronics, a comprehensive risk assessment of the parts list is carried out. When series production is commissioned, the customer can then choose the appropriate level of obsolescence management for their products. We are guided by three predefined packages:

Reactive obsolescence management: included for all hema customers

Reactive obsolescence management is standard for all assemblies manufactured by hema. Our purchasing team checks which customers and projects are affected by incoming product change notifications (PCN) and end-of-life announcements. We work together with our customers to develop joint measures, from replacing parts with equivalent components to last-time buy and long-term storage through to redesigning the electronics. In this way, we ensure the longest possible availability without delays.

Proactive obsolescence management: acting instead of reacting

The earlier companies recognize potential life cycle risks, the longer the scope for action to make adjustments. This is why, as part of our proactive obsolescence management service, we check the bill of materials once a year and create a risk assessment, which we provide to the customer in the form of a report with specific recommendations for action. We discuss these in a strategy meeting, during which specific measures are agreed. In addition to the annual report, the package also includes regular consultations on purchasing and supply chain risks, both with the customer and with suppliers.

Strategic obsolescence management: for maximum safety

In addition to proactive procurement management, this service also includes continuous market monitoring by our PCN team, which carries out risk analysis as well as replenishment times, forecasts and cost analyses. In conjunction with a second-source strategy for central components and customer-specific management of stock levels, this ensures maximum security and lead time should product adjustments be necessary.

Processes and partnership for long-term and reliable delivery

In addition to these packages, hema works with internal processes that provide double security: for example, we check the revision status of components and purchased system on modules in purchasing and include these on orders and production orders. Changes that are not recorded by the PCN team can still be identified

and processed. In addition to regular exchanges with customers, we also maintain strategic partnerships with our suppliers. This close cooperation, fixed contacts and commitment enable us to react quickly and take individual measures that go far beyond the usual.

Our promise: hema does not discontinue products

Within hema electronic, development, production and service are located under one roof at the Aalen site. This ensures short distances and also contributes to flexibility and reliability in delivery—even for a product life cycle of 30 years or more for many series products. For some assemblies, we even keep special soldering technologies running that are no longer used for new developments. The result and our promise for the future: hema does not discontinue any products and takes extensive measures to ensure that electronics will continue to meet the highest standards of reliability, quality and availability for many years to come.



OBSOLESCENCE MANAGEMENT

Reactive OM

Action after an end-of-life message has been received.

(increased risk)

Measures

- Identify in which assemblies the component is present and contact the customer with the following suggestions:
- Last time buy
- Long-term storage
- Form fit function (an alternative for a component part)
- Redesign
- Development of a sustainable new design

Proactive OM

Action before an end-of-life message is received.

(early warning, long scope for action)

Measures (1x per year)

- Availability check of all components incl. risk assessment of the components
- Lifecycle analysis of parts lists as early as the development phase
- Partnerships and contracts with manufacturers and suppliers
- Electronic monitoring of key components
- Regular coordination with customers
- + Reactive OM

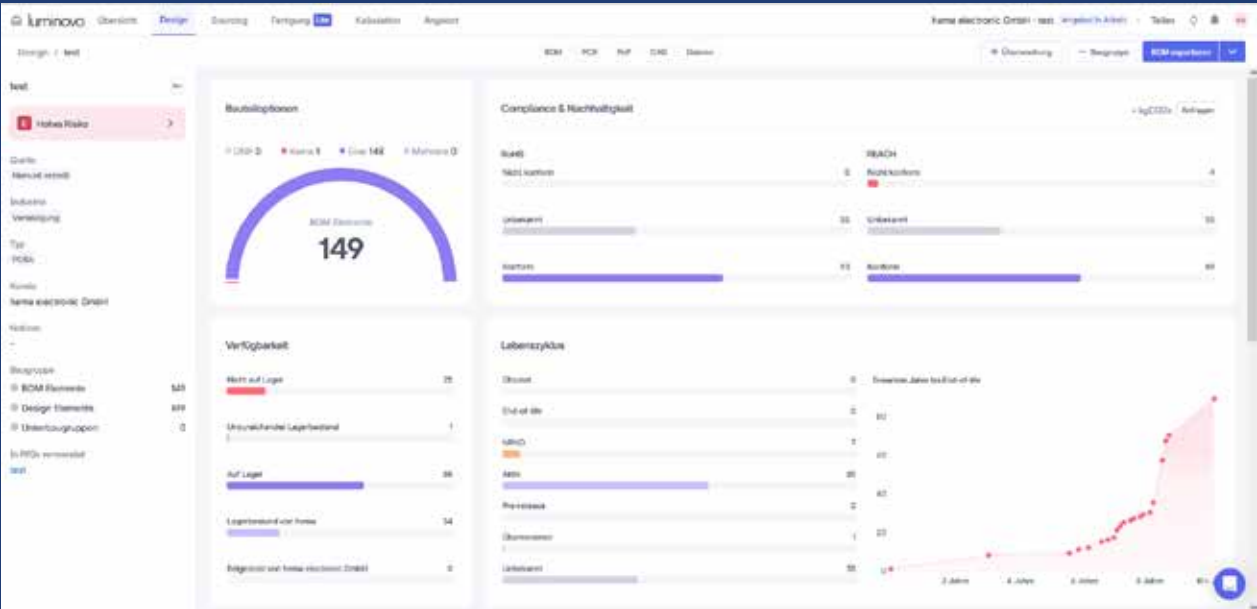
Strategic OM

Long-term strategy: Regular forecasting and cost analyses over the entire product life cycle; as early as the development phase.

(anticipatory action)

Measures (1x per year)

- Checking the current replenishment times
- Second source strategy (multiple suppliers from the same manufacturer and/or alternative components from other manufacturers)
- Inventory management (active monitoring of key components at the suppliers)
- + Reactive OM
- + Proactive OM



Stay in touch with the hema visioneers!

Telephone

Workdays 7.30 AM to 4 PM (CET)

+49 7361 94 95 0

Email

Please feel free to send us an email to
sales@hema.de



Website

Our hema electronic website provides you with information about our services and the company. Here you can reach us via the contact form.

www.hema.de



Social Media

You can also find interesting news and updates on the following social media channels: LinkedIn, YouTube, Instagram and Facebook.

Publisher

hema electronic GmbH
Röntgenstraße 31
73431 Aalen

Tel. +49 7361 94 95 0
info@hema.de
www.hema.de

Officer

Mateusz Dobski
Head of Marketing
hema electronic GmbH

Design

Inhouse

Photo credits

iStock, Jan Walford, hema