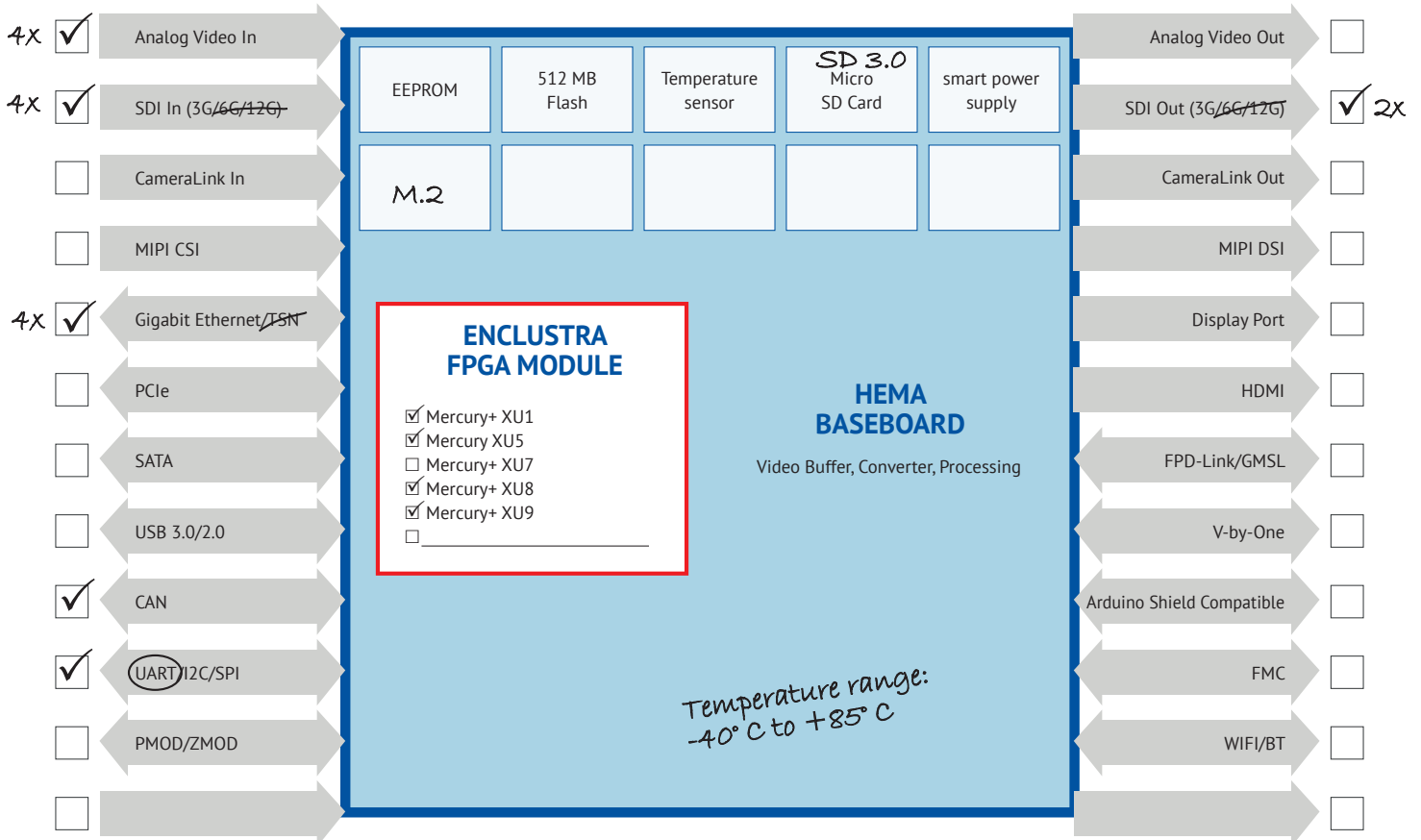


## The challenge:

Development of a robust optronic system suitable for series production for wheeled vehicles of a German military technology company



## My experiences in the cooperation with hema:

### Design competence

Because the level of competence in the field of embedded vision is extremely high.

### Sincerity

Because I'm sure that hema will work on my project with the same level of commitment as I do.

### Capacity

Because that's where I get the competence and capacity for my development projects.

### Platform

Because modular concepts and platforms deliver strategic advantages.

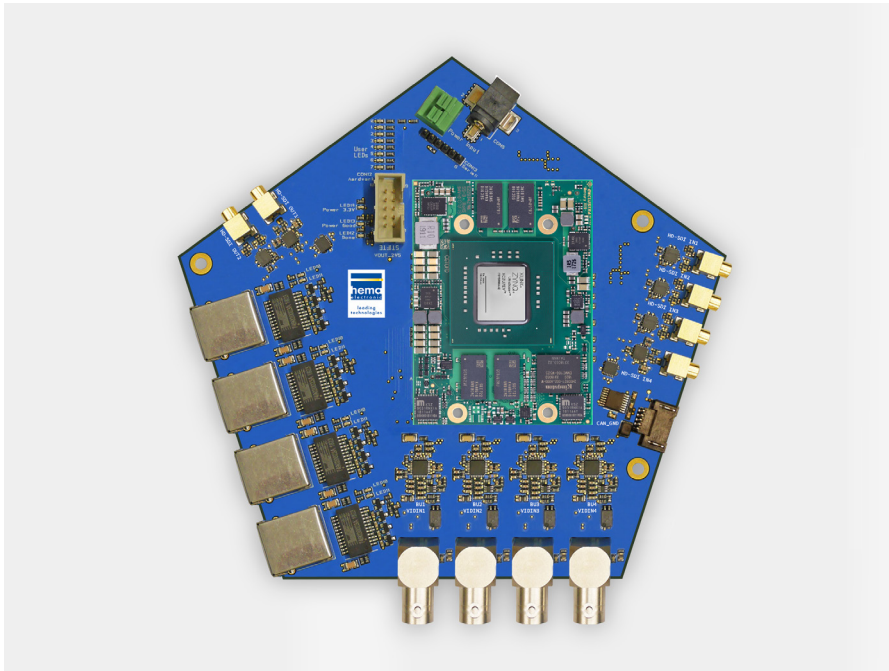
### Future-proof

Because I can pick up my project again and continue it at any time.

... because working with hema is simple, binding and effective!

## The solution – finished in 6 weeks:

### Custom electronics for stationary and mobile video data distribution



Mobile systems often have a large number of video sensors, including day vision and thermal imaging cameras, TOF, radar and LIDAR systems. The video matrix ensures that every user receives the video data relevant to him at the time - making what the sensors see visible to humans. The challenge for this system: to manage different video sources and up to 16 camera inputs.

The video distribution unit is based on the modular hema system construction kit for embedded vision systems. The core element of customer development is the management of video data in the FPGA: up to 16 HD-SDI inputs are processed and can be distributed to the outputs. All functions are implemented with lowest latency times of less than 35ms. Ultra Low Latency is possible both with pass-through (approx. 5ms) and compression (e.g. Xilinx Ultra Low Latency IP-Core, approx. 35ms). Furthermore,

the requirements for robust and reliable electronics for mobile use are guaranteed. Availability and maintainability were also important general conditions.

With the video distribution unit, a multitude of different input and output interfaces can be realized. Depending on the processing power requirements and the number of desired inputs and outputs, different modules can be flexibly combined and the processing power scaled. For example, various FPGA modules (SoCs) from our cooperation partner Enclustra can be used, such as XU1, XU5, XU8 or XU9 modules. Any inputs can be switched to any outputs via a matrix. Pass-Through is also possible in order to output a video signal as directly as possible and without time delay (latency).

HD-SDI, 3G-SDI, 6GSDI, 12G-SDI, CoaXPress, USB3, Gbit Ethernet and analog video are available as camera

interfaces for editing and processing various camera inputs. In addition to Ethernet and USB, CAN and UART are also available as communication interfaces. Video streams can be output compressed (H.264, H.265) or uncompressed. SD-Card 3.0, SATA, PCIe or M.2 are suitable for storage or recording. GPS, W-LAN and mobile phone interfaces such as Bluetooth can also be used.

Multiple video streams can be combined to DualView, QuadView or Picture-in-Picture. An individual overlay of text, symbols or graphics can be applied to all video outputs. Various other functions such as distortion can also be eliminated or images can be strung together (for all-round vision). The Video Distribution Unit can also be used to realize different outputs (for example monitors) with different output interfaces: HD-SDI up to 12G-SDI, USB3, Gbit-Ethernet up to 5Gbit-Ethernet and analogue interfaces.

#### APPLICATIONS

- Optronic systems for vehicle transfer (panoramic view, reversing systems) and in defence technology (target systems)
- in wheeled vehicles, tracked vehicles, passenger cars, official vehicles, construction and mining vehicles, agricultural machinery, logistics (trains, heavy transporters, forklift truck)
- Marine applications: frigates, submarine