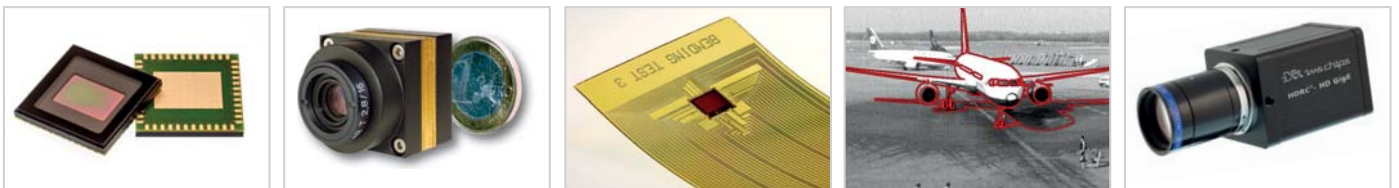


Imaging sensors

COMPETENCES

In the Business Area Integrated circuits & systems we research, develop and industrialize high-dynamic-range customer-specific CMOS image sensors and cameras based on our comprehensive expertise in CMOS circuit design, optical technology, packaging, system integration and image processing for the innovative development of new image and camera technologies.



AREAS OF ACTIVITY

CMOS image sensors

- ◆ Extremely high-dynamic HDRC[®]
- ◆ Global- and Rolling Shutter
- ◆ Multi-spectral
- ◆ Application-specific image sensors

Image sensor systems and cameras

- ◆ Miniaturized circuit packaging
- ◆ Electronics development
- ◆ FPGA, embedded processors
- ◆ Software development

Contact-free temperature measurements

- ◆ HDRC[®] Q-PyroCam
- ◆ Spatially-resolved (640 x 480 pixel)
- ◆ Independent of emissivity
- ◆ High-temperature (600 – 1900 °C)

PROJECTS & APPLICATIONS

In German and European research projects we contribute to the development of new imaging systems. In combination with Micro- und Nano-Technologies e.g. spectral filter or special lens elements as add-ons on image sensor wafers can be integrated using our clean room processes. Also, flexible systems in foil with embedded ultra-thin imagers can be realized. The latest areas of research and development have been intelligent robotics using (3D) object recognition, AI-algorithms in embedded systems and integration technologies for biomedical sensor systems.

◆ HiDRaLoN

High Dynamic Range Low Noise CMOS Imagers

◆ AeroPantoCam

sensor system for monitoring of railed vehicle pantographs

◆ MULTI-3D

Highly dynamic linear CMOS image sensor

◆ Flexible Systems in Foil

Ultra-thin image sensors embedded in flexible foils

◆ Mikro- / Nano- Add-ons

Spectral filter und diffractive Elemente on image sensor wafer

◆ Biomedical technology

◆ Machine Vision

◆ Safety technology

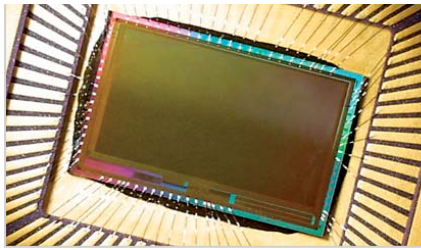
◆ Process automation

◆ Robotic

REFERENCES

Many outstanding products and applications by our partners and clients are using the IMS-made HDRC[®] (High Dynamic Range CMOS) image sensors. This is enabled by the high-dynamic range of more than 120 dB which means that the brightness ratio is larger than 1. 1,000,000 of these HDRC[®] image sensors are therefore products with a unique feature. We support the industrial implementation starting with the specification all the way to the series in accordance with the quality standard ISO 9001:2015.





CMOS image sensors and cameras designed for highest requirements, custom-specifically developed and manufactured

Many companies and research facilities worldwide are using HDRC[®] sensors and cameras based on the HDRC[®] principle. HDRC[®] image sensors (High-Dynamic-Range CMOS) have very high brightness dynamics of up to 170 dB. Standard and customer-specific products are available in monochrome or color with Rolling or Global Shutter. HDRC[®] sensors are available in various resolutions and sizes of 200 x 180 pixels for endoscope applications up to 1296 x 1092 pixels including HD 720p.



HDRC[®] VGAx, 768 x 496 pixels, 30 images/s



CCD camera, 1280 x 960 pixels, Automatic mode, 25 images/s

Industrial image processing

High-dynamic image sensors for automation and inspection tasks under extreme lighting conditions and for safety applications in security and surveillance areas.

Biomedical technology

Integrated optical sensors for fluorescence microscopy und spectroscopy, miniaturized imagers for endoscopy.

Air and Space

Radiation-resistant sensor design and manufacturing technology for use in space.

Automotive

Image sensor technology for traffic technology in a difficult environment.

These cameras bear the unique characteristics of HDRC[®] image sensors

HDRC[®] Q-PyroCam

Touchfree high-temperature measurement-calibrated and independent of the emissivity of the temperature scene

seelectorICAM weld, seelectorICAM LASER, seelectorICAM HD4

Intelligent high-performance cameras with high-speed DSP and High-Dynamic-Range Imager for online process control and robotic applications

PILZ PSEnvip

Camera system for safe zone monitoring at presses and tooling machines

Honeywell Advanced Visual Docking Guidance System

Safe aircraft docking in designated STOP position



An experimental development platform is provided capable of utilizing and evaluating all HDRC[®] sensor characteristics for research and development tasks. Our partnering companies GEVITEC and hema electronic GmbH offer HDRC[®] cameras and systems for industrial applications. Due to our years of experience with various client contracts and research projects we have been able to achieve a comprehensive expertise in circuit design, optical technology, packaging, system integration and image processing of new image sensor technologies - from specification to industrial implementation - in line with the ISO 9001:2015 quality standard.

HDRC[®] Quotient Pyro Camera GigE – the calibrated infrared camera



The Q-PyroCam GigE displays the temperature distribution of a scene and a parallax-free gray scale image. In order to adjust to the geometrical conditions of the measuring system lenses with various focal distances (25, 50 and 75 mm) at variable luminosities can be applied. The bi-spectral image sensor (640 x 480 Pixel) processes the radiance analog to a radiance ratio pyrometer and, thus, compensates the emissivity distribution.

Variety of lenses to adjust the measurement system's visual field



MeVis - CF 1,8/50

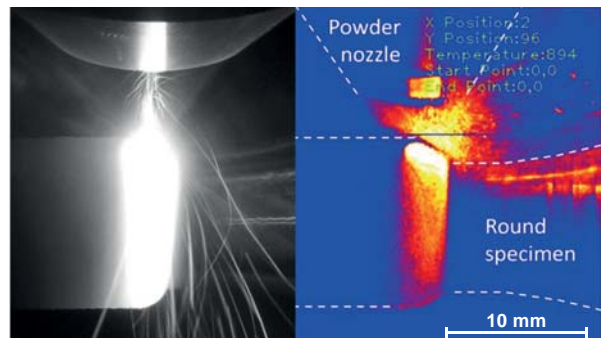


TAMRON 2,8/50



TAMRON 3,9/75

Build-up welding



Determination of width of melting zone using HDRC[®] Q-PyroCam GigE
 (© BIAS – Bremer Institut für angewandte Strahltechnik / IMS CHIPS)

Characteristics

- The unknown emissivity process on the surface is compensated pixel by pixel through the generation of the quotient
- Extremely large temperature range made possible by the dynamic range of the image sensor (600°C – 1900°C)
- Definition of small monitoring areas (ROI) enables higher Image rates (up to 4000 images/s)
- Easy handling through Ethernet interface (GigE)
- Visualizing software for WIN10/64bit, DLL for customer-owned application software

Applications

- Control of highly-dynamic cut and welding processes
- Determination of temperature profiles of surface-emitting diodes (flame-cutting, mill train)
- Control of material fusing processes (laser surface-layer welding)
- Control of combustion chamber (clinker, tile, cement production)

Electro-optical measurement technology



Highly dynamic optical test facilities with powerful electrical measurement technology and computer-aided evaluation for semi- and fully automatic illumination measurements.

Methods

- Commissioning of hardware and software for new image sensors
 - Electrical characterization of integrated analog and digital circuits
 - Control, timing and measurement acquisition
- Image sensor measurements and analyses
 - Opto-electronic transfer function (OECF)
 - Image analyses (homogeneity, optical crosstalk, ...)



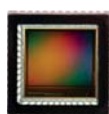
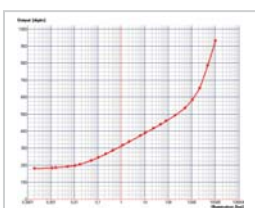
Equipment

- Analog and mixed-signal measurement techniques
 - Oscilloscopes, function generators, voltage sources
- Optical measurement techniques
 - Radiometers
 - Controlled light sources cold light/LED
 - Integrating sphere
 - Lenses/optical elements, test charts color/monochrome, camera housings
- Digital image recording and processing (machine vision)
 - Camera hardware and evaluation platform
 - Framegrabber CameraLink / GigE
 - Software: own C++ programs with GUI and LabView
- Electro-mechanical processing capabilities (ESD protected)



Examples

HiDRaLoN



KonKaMis



SITARA

