

EMBEDDED VISION & AI

FOR AGRICULTURAL VEHICLES AND MACHINERY





DELIGHTED CUSTOMERS OUR VALUE PROPOSITION

Dear business partner,

As an owner managed company, we value trust, fairness and cooperation in our working environment. We are committed to making certain that you are delighted with our products and services.

As a partner to our customers, we are constantly developing the best solution for the respective application area and, if required, manufacture customer-specific solutions in Germany – also in small series. We offer professional consultations focused on delivering solutions – the fundament for a productive cooperation. To ensure the consistently high quality of our products, we conduct extensive tests both prior to initial launch and once production has started. Additionally, we affirm our quality commitment with a 48 months warranty.

As a dynamic company with a streamlined organisation structure, we always aim to offer the best cost-benefit ratio. We look forward to collaborating with you to find solutions for your specific requirements.

Sincerely

Dr. Matthias Feistel

Martin Groschke



A NETWORK OF PROFESSIONALS AUTHORISED DISTRIBUTORS

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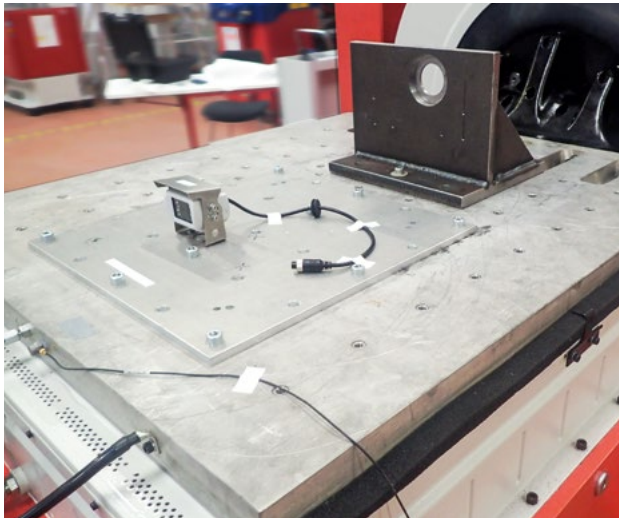
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RUGGED EMBEDDED VISION & AI SYSTEMS FOR USE ON MOBILE MACHINES

At our head office in Hamburg, we develop digital camera systems and embedded systems for demanding applications in commercial vehicles and mobile machines.

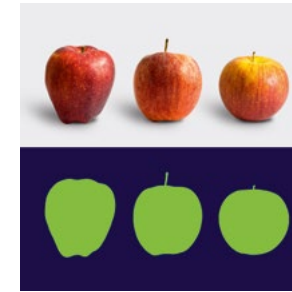
With the development of robust AI embedded systems, we enable embedded machine vision and AI applications in real time. With our hardware, multiple high-resolution camera feeds can be assessed with low latency and sophisticated robotics and automation applications on commercial vehicles and mobile machines can be performed. The fanless and maintenance-free AI edge systems from LUIS meet the high protection classes IP67/69k and meet high requirements for shock, temperature and vibration.

If required, we also develop and manufacture customer-specific solutions - also in small series. As an owner-managed company a trusting and cooperative partnership is very important to us.



IRREGULARITIES

Pixel-precise detection and marking of irregularities



QUALITY & FORM

Evaluation of the quality and maturity of the products on the basis of the shape



CLASSIFICATION

Object recognition and classification in real time, e.g. for targeted fertilization

PERFORMANCE ARTIFICIAL INTELLIGENCE (AI) AI MACHINE VISION IN REAL TIME

With our subsidiary LUVIS AI GmbH, we are pursuing the goal of developing machine vision, classic image processing and artificial intelligence applications for the market with mobile machines and meeting the high requirements of the sectors of agriculture, construction, waste disposal or logistics.

The use cases are diverse and in addition to driver assistance systems, increasingly involve (partially) automated work processes. All applications run embedded, i.e. on the device and do not require a server in the background. A broad toolchain of software, simulation algorithms and in some cases, pre-trained neural networks is available for the respective use case.

For the training of large data sets a powerful training pipeline on GPU servers is used, which employs modern methods to minimize the training effort.



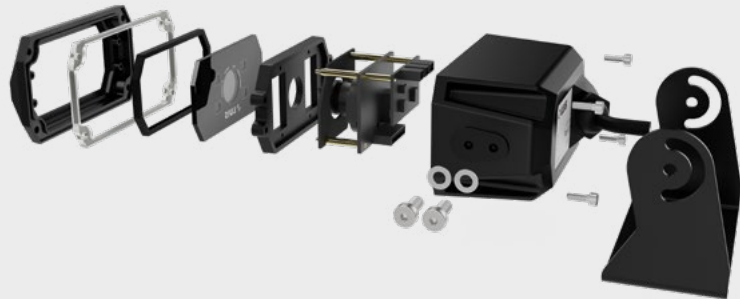


LUIS DIGITAL CAMERAS

FOR USE IN CHALLENGING ENVIRONMENTS

Our digital camera portfolio includes a wide range of different camera types. Our LVDS cameras transmit the raw data at a speed of up to several gigabits per second, allowing the uncompressed image to be processed without loss. Our Ethernet cameras are available as Fast Ethernet (100BASE-TX) and BroadR-Reach (100BASE-T1) versions. The image is low latency (<100 milliseconds), compressed (H264/ MJPEG) and processed (e.g. with white balance, gamma or color correction).

All cameras are manufactured according to the automotive requirements with regard to temperature resistance, dust and waterproofness, vibration as well as vibration and shock according to corresponding ISO standards.



LUIS ETHERNET CAMERA TX

POWERFUL FAST ETHERNET CAMERA

- › Sensor 1/3" CMOS
- › Resolution 2 MP (1080P)
- › Viewing angle 110° horizontal (others on request)
- › Fast Ethernet 100BASE-TX
- › 100 Mb/s
- › Latency < 200 ms
- › Video out H264 and H265
- › IEEE 802.3, IP, TCP, HTTP, RTSP
- › Night vision up to 10 m
- › Temperature -30 to +70 °C
- › Water and dust proof IP69k
- › Heater (optional)
- › Microphone (optional)
- › DC 12 V / 24 V / IEEE 802.3af POE

LUIS ETHERNET CAMERA TX ULTRA

LOW LATENCY FAST ETHERNET CAMERA

- › Sensor 1/3" CMOS
- › Resolution 1.2 MP
- › Viewing angle 90° or 130° horizontal (others on request)
- › Fast Ethernet 100BASE-TX
- › 100 Mb/s
- › Latency < 100 ms
- › Video out MJPEG, H264
- › IEEE 802.3, IP, TCP, HTTP, RTSP
- › Night vision (optional)
- › Temperature -40 to +85 °C
- › Water and dust proof IP69k
- › Shockproof up to 100 G
- › Heater (optional)
- › DC 12 V / 24 V / IEEE 802.3af POE

LUIS BROADR-REACH CAMERA ULTRA

LOW LATENCY ETHERNET T1 CAMERA

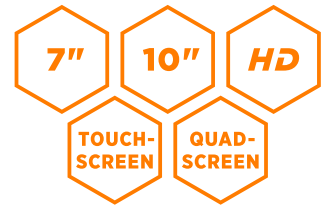
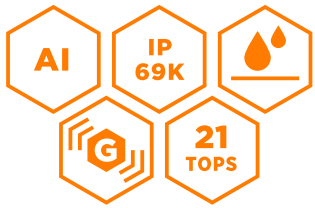
- › Sensor 1/3" CMOS
- › Resolution 1.2 MP
- › Viewing angle 90° or 130° horizontal (others on request)
- › BroadR-REACH 100BASE-T1
- › 100 Mb/s
- › Latency < 100 ms
- › Video out MJPEG, H264
- › IEEE 802.3, IP, TCP, HTTP, RTSP
- › Night vision (optional)
- › Temperature -40 to +85 °C
- › Water and dustproof IP69k
- › Shockproof up to 100 G
- › Heater (optional)
- › DC 12 V / 24 V / IEEE 802.3af POE

LUIS ETHERNET CAMERA 180°

LOW LATENCY FAST ETHERNET CAMERA 180°

- › Sensor 1/3" CMOS
- › Resolution 1.2 MP
- › Viewing angle 180° horizontal
- › Fast Ethernet 100BASE-TX
- › 100 Mb/s
- › Latency < 100 ms
- › Video out MJPEG, H264
- › IEEE 802.3, IP, TCP, HTTP, RTSP
- › Night vision (optional)
- › Temperature -40 to +85 °C
- › Water and dustproof IP69k
- › Shockproof up to 100 G
- › Heater (optional)
- › DC 12 V / 24 V / IEEE 802.3af POE





LUIS HEAVY DUTY EDGE SYSTEMS

FOR THE MOST DEMANDING APPLICATIONS

The AI System is one of the most rugged embedded systems based on Nvidia in the market. The rugged system meets the protection class IP67/69k. In addition, it is shock and vibration resistant as well as dust- and waterproof. Furthermore, the rugged system is suitable for extended temperature range of -40 to +70 degrees Celsius designed. As an AI accelerator the powerful NVIDIA Xavier NX is used.

With up to 21 TOPS of accelerated computing power multiple high-resolution camera feeds can be evaluated with low latency or implement sophisticated robotics and automation applications.

In addition to AI supersystems, we are also developing rugged, ARM-based rugged, ARM-based boards for mobile machines and demanding environments.

QUALITY FEATURES

- › 21 TOPs
- › 8GB 128-bit RAM
- › Fanless
- › 24/7 operation possible
- › Water- and dustproof according to IP67
- › Shock and vibration resistant
- › CAN interface
- › Optional LTE & WiFi extensions
- › DC 12 / 24 V

LUIS TOUCH MONITORS

HIGH FUNCTIONALITY AND BEST PICTURE

The new LUIS 7" and 10" touch monitors combine maximum functionality with a slim and robust design. The development is based on the knowledge and experience of the last 20 years with the claim to develop the leading monitor on the market.

Particularly noteworthy are the very high resolution and the brightness. In addition, the monitor recognizes independently which camera signal is connected and enables the simultaneous display of AHD and CVBS/NTSC/PAL. In the menu a variety of (split) views as well as triggering can be individually set and stored in specific driver profiles. Through the implementation of four freely programmable buttons and four I/O outputs, additional functionalities can be integrated into the monitor.

QUALITY FEATURES

- › LUIS 7- or 10-inch with touch screen
- › Optional: split function
- › Resolution 1,280 x 768 pixels (7-inch) and 1,280 x 720 pixels (10-inch)
- › Brightness 500 cd/m2
- › Operating voltage 9 to 32 V
- › Controllable LED warning stripes
- › Automatic switching PAL/NTSC and AHD/CVBS
- › 4 video inputs with audio function
- › Built-in loudspeaker
- › 4 freely programmable keys
- › 5 I/O inputs and 4 I/O outputs freely customizable





LUIS ADAPTER

CONNECT LUIS CAMERA TO EXISTING DISPLAYS

With the appropriate adapter, LUIS cameras can be easily integrated into an existing OEM display, HMI or navigation device.

LUIS has the right adapter solution for all common vehicle models – even for shutter cameras.

Also for the use of competitor camera, monitor or cable systems LUIS also carries the appropriate adapters for the use of competitor camera, monitor or cable systems, so that existing infrastructures can be used and a changeover to LUIS can be made smoothly.

If however an adapter is not available in the standard range our our technicians are usually in a position to offer a solution. Please do not hesitate to contact us. We are looking forward to help.

OEM ON-BOARD SYSTEMS

- › John Deere 6R, GS3 color monitor 2630 and Command Center Touch for 7R/8R/9R Series
- › Fend Variotronic Display 819-828 and 924-939
- › Case-IH AFS Pro 200, 300, 700
- › New Holland IntelliView II, III, IV Systems
- › Trimble parallel drive system

LUIS TRAILER CABLE SET

TRAILER CONNECTION

- › ABS socket and spiral cable set for connection of a rear view camera (also shutter cameras)
- › 7-pin connectors
- › Non-interchangeable due to special coding
- › Very stable spiral cable with ABS connectors, IP69K, ADR tested
- › Trailer detection for switching to the rear camera (optional)



LUIS DIGITAL TRANSMITTER SET

HIGH RELIABILITY AND LOW LATENCY

- › Wireless connection of camera and monitor
- › Stable and low-interference digital radio
- › End-to-end encrypted
- › Simple pairing
- › Waterproof housing (IP65)
- › I/O for drive mode-dependent control
- › Low latency (< 200 ms)
- › Operating voltage 9 to 32 V



LUIS WIFI TRANSMITTER PROFESSIONAL

VIDEO TRANSMISSION TO ANDROID AND IOS DEVICES

- › Transfer of the camera image to smartphone, tablet or navigation device with WiFi function (Android and iOS)
- › End-to-end encrypted
- › Rugged, waterproof and dustproof case (IP69k)
- › I/O for automatic activation of the app (Android only)
- › Low transmission latency (< 200 ms)
- › Operating voltage 9 to 32 V



LUIS MOBILE BATTERY

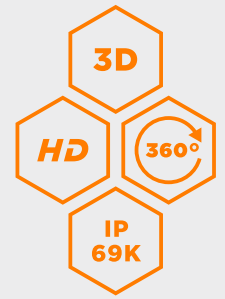
FOR MORE FLEXIBILITY AND EASY RETROFITTING

- › Powerful battery (8,700 mAh)
- › Compatible with LUIS camera models- and wireless modules
- › Rugged and waterproof case
- › Magnetic back for an easy and flexible assembly
- › Battery life 14 hrs. (160mA@11.1V)



LUIS 3D HD 360° SURROUND VIEW PROFESSIONAL

HIGH-PERFORMANCE 360° SYSTEM



QUALITY FEATURES

- › High resolution
- › 3D representation of the vehicle for better orientation
- › Multiple view modes depending on driving mode
- › Simple and fast auto calibration on the system
- › Camera with IP69k protection class (according to ISO 60529:2014)
- › Temperature resistant -40 to +85 °C (according to ISO 16750-3:2012)
- › Operating voltage 9 to 32 V
- › Variant with person detection (AI-based) 360° all around the vehicle in real time





LUIS CROSS TRAFFIC CAMERA SYSTEM

LEGALLY COMPLIANT IN ROAD TRAFFIC

Particularly for agricultural machinery with a front end of > 3.5 m, there is a risk of danger when turning out of the field or exits. In order to view these areas, LUIS offers a technical solution. With this solution you are moving in road traffic in compliance with the law and replace the otherwise legally required guide.

Two front cameras mounted on the left and right monitor the area in front of and to the side of the tractor or front loader. This enables an optimal view of the road traffic when turning in and into blind intersections. A monitor in the cab shows the two images in a split-screen display.

At a glance, the farmer can see the road ahead to the left and right. This not only maximizes road safety, but also comfort. He sees what he would otherwise not see: When exiting buildings, stables, and when turning into blind intersections.



LUIS VIRTUAL MIRROR

DIGITAL MIRROR REPLACEMENT IN A NEW DIMENSION

The LUIS Virtual Mirror is a digital mirror replacement system in which mirrors are replaced by high-resolution digital cameras and monitors. Thanks to an enlarged field of vision and the use of sensors for significantly better visibility in the dark and against the light, safety is increased compared to conventional mirrors. Thanks to the compact design and the respective positioning on the cab, damage and aerodynamic drag can be reduced.

The viewing areas are displayed in combination on just one monitor per side in the cab. The environment can thus be grasped more quickly and hazardous situations better assessed. By superimposing overlays or using a digital zoom or changing the image section depending on the maneuver, the machine can be handled more efficiently.

The virtual mirrors are available in long and short arm versions for cabs with/without overhang. We also offer individual designs and adaptation to the respective machine in small series.

The system is currently under development. Functional samples on request.

EMBEDDED AUTOMOTIVE AI PLATFORM

DEEP LEARNING SOLUTIONS THAT FIT YOUR REQUIREMENTS



RECOGNIZING OBJECTS AND PEOPLE

Classification of objects in real time, e.g. of persons. We use our high-performance networks based on many millions of annotated data.



PREDICT DIRECTION OF MOVEMENT

Predicting the movement of people and objects e.g. to predict when they will enter a predefined zone to issue warnings as early as possible or warnings to calculate the time to collision.



CALCULATE DISTANCES (2D AND 3D)

Calculation of distances between objects using the known camera position. For precise positioning, 3D data can also be assessed and the exact position of an objects can be determined.



3D OBJECT DETECTION AND POSITIONING

We use 3D ToF (Time of Flight) cameras, to detect objects and to precisely estimate the position. The positioning accuracy is so high that objects can then, for example, be gripped. Coordinates passed on to the gripping system, for example.



MARK DWELL TIME

The length of stay-algorithm marks objects, e.g. with a different color of the bounding- box as soon as they exceed a certain dwell time.



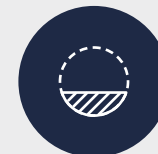
LISTENING TO ANOMALIES

The detection of anomalies is based on an acoustic basis. Via a MEMS and our acoustic AI application deviations from normal operation can be detected at an early stage and further processed.



DEFINE ZONES

Marking of objects entering a defined area (e.g. dangerous areas around a vehicle or the working area of a machine).



SEGMENT OBJECTS

Pixel-precise detection and marking of defects, irregularities and objects or measuring the fill level.



LUIS EDGE AI CAM

RUGGED CAMERA FOR THE DETECTION OF PERSONS

The LUIS EDGE AI CAM is an intelligent camera that can differentiate people from another obstacle in real time and can warn the driver in a multi-level manner in case of danger. It warns the driver only of collisions with persons or other trained object classes, without unnecessarily alerting the driver to other objects and avoid an associated loss of vigilance. In this way the LUIS EDGE AI CAM helps to effectively avoid collisions with people especially in tight driving situations.

The LUIS EDGE AI CAM has been designed to hold against harsh conditions and environmental influences. The object detection runs on the camera (»embedded«) without additional hardware and ECUs.

The detection zones and the warning mechanisms can be individually adapted to the respective vehicle and signals can be emitted to the outside.

For even more precise person recognition and localization we are further developing the LUIS EDGE AI CAM and adding a depth sensor (Sensor Fusion).



**MOVING
SAFELY ▲**



WE ARE HAPPY TO HELP!
YOUR CONTACT

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