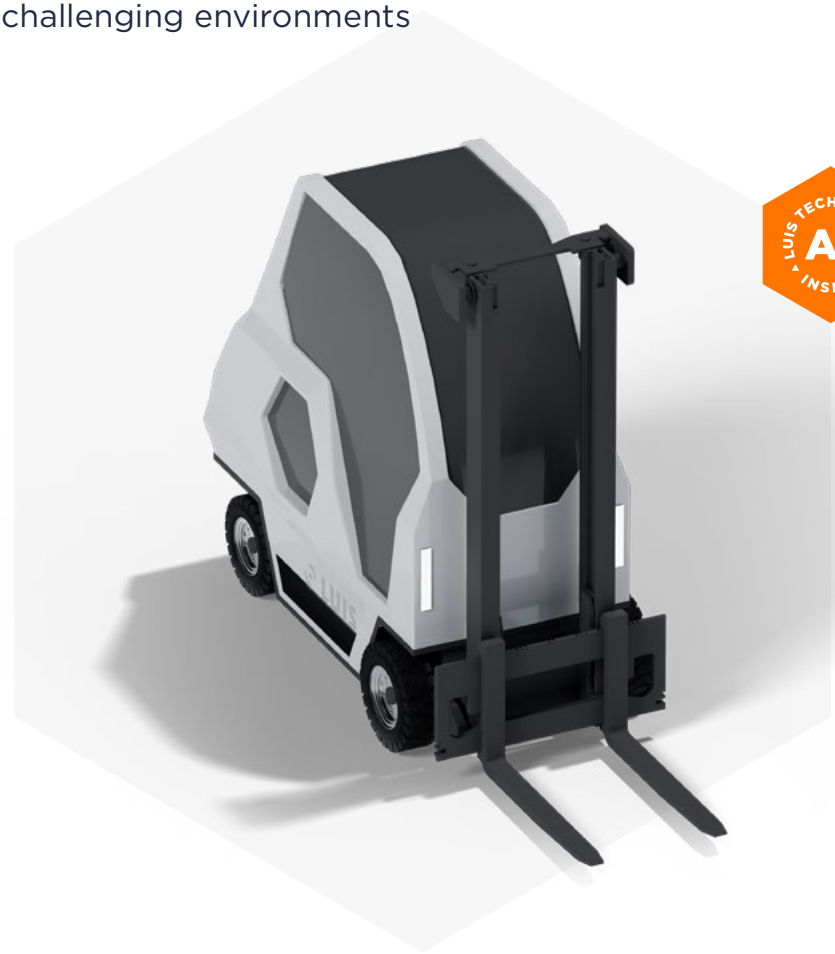
LUIS
TECHNOLOGY

Innovative solutions for industrial trucks

Advanced camera monitor systems
for challenging environments



luis.de

Our company

From Hamburg, we make the world safer

Managing partners
Dr. Matthias Feistel and Martin Groschke

As an owner managed company we place great value on a trusting and collaborative partnership.

LUIS focuses on artificial intelligence, embedded vision, and driver assistance systems. LUIS has one of the most reliable AI networks on the market and has developed a camera with integrated (embedded) AI. This LUIS EDGE AI camera is used in commercial vehicles within the logistics, construction, agriculture, and municipal sector. Our most popular products include analog and digital cameras, monitors, turn and moving-off assistants, embedded AI cameras, as well as solutions for AI analysis of cargo space.

Since our founding in 1999, LUIS has evolved into a leading manufacturer of camera-monitor and driver assistance systems in Europe. With an extensive distribution and service network, we respond quickly to market demands and offer expert support. Our solutions are characterized by high reliability, market-leading AI performance, and suitability for demanding heavy-duty applications.

Since 2015, we have consistently invested in expanding our team and capacities, building unique expertise in hardware, software, and AI development. We work »hand in hand« with manufacturers for the series integration of our solutions. The importance of AI will continue to grow in all product areas in the future. With »LUIS SAFE VISION AI«, we are currently developing certifiable AI solutions for safety-critical applications, positioning ourselves as a pioneer in this field.

The LUIS team looks forward to addressing your needs with customized solutions.

Discover our locations

We are represented at four strategic sites, each offering unique strengths

LUIS Technology GmbH

- **Hamburg**
  Our headquarters and the hub of all activities – from development to shipping and service
- **Frankfurt am Main**
  Center for research with a focus on embedded software development
- **Ipsheim**
  Home of the LUIS Academy and our sales office

LUIS Technology B.V.

- **Hengelo, Netherlands**
  Sales and service for the Benelux countries

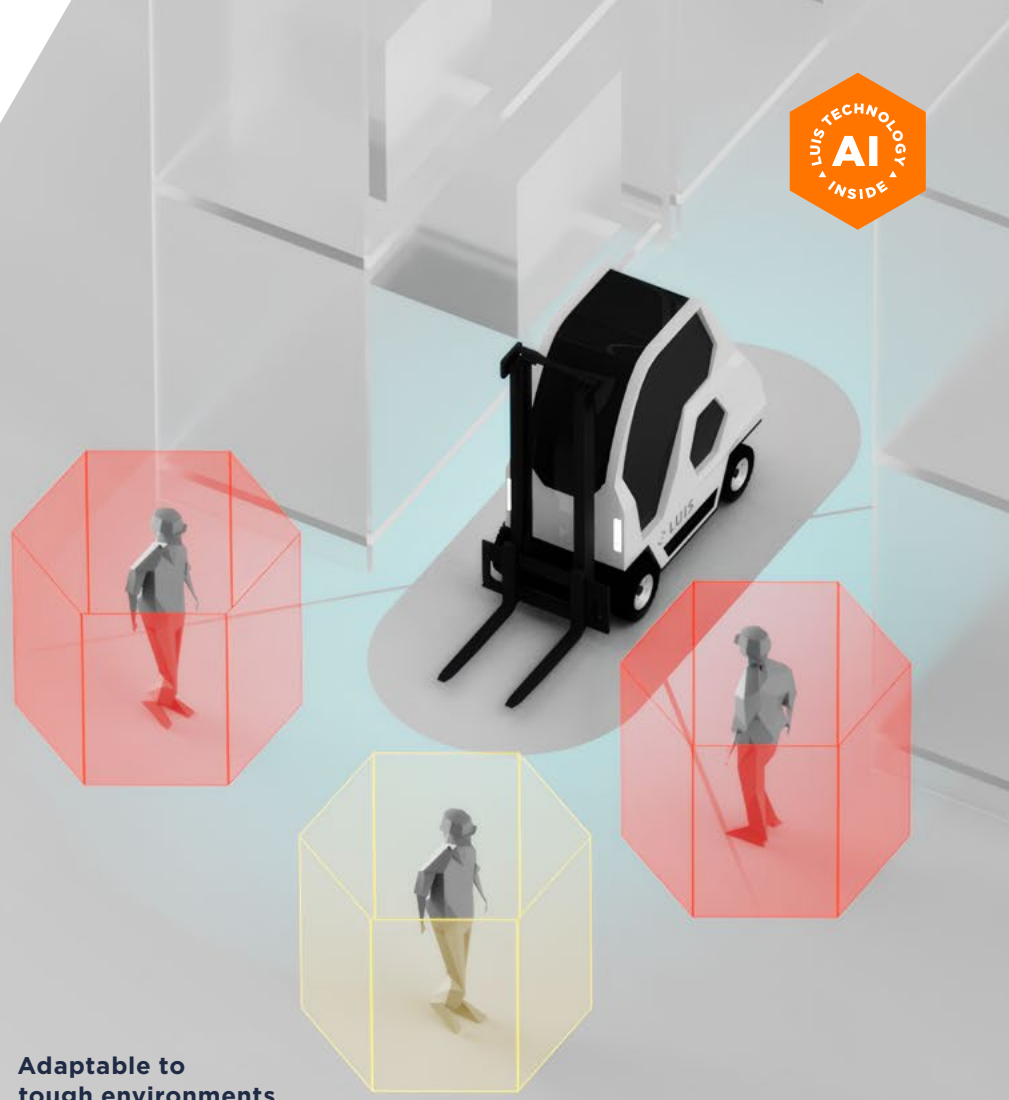
Preventing workplace accidents with intelligent AI

Industrial-grade AI redefining safety with real-time risk detection

Workplace accidents remain a serious risk, especially in high-risk industrial and construction environments. LUIS Technology is committed to changing that with advanced AI-powered person recognition.

Our solutions detect individuals in real-time, distinguishing them from machinery or obstacles to prevent accidents before they happen. Designed for mobile machines like forklifts and excavators, our systems integrate seamlessly, ensuring reliable performance even in tough conditions.

At LUIS Technology, we redefine safety with innovative, human-centered AI solutions – protecting lives and setting new standards for workplace safety.



Advanced person recognition AI

Detects individuals in real-time to prevent accidents in industrial and construction environments

Real-time risk detection

Differentiates people from obstacles, minimizing potential collisions

Adaptable to tough environments

Functions effectively in challenging, high-risk workspaces

Seamless vehicle integration

Works with forklifts, excavators, and other mobile machinery to enhance operational safety

On-device processing

Ensures fast, reliable performance without the need for additional hardware

Redefining safety standards

Prioritizes human-centered AI for smarter, safer operations

SAFE VISION AI

Safe AI made in Hamburg

With Safe Vision AI, we have developed a framework for the application of safe AI for commercial vehicles and mobile machines

Real-time monitoring

of hardware and software

Trustworthy AI

in compliance with upcoming ISO standards

Made in Germany

and in compliance with the EU AI Act

Our AI runs on secured hardware. A safety controller monitors the video pipeline and the functionality of the AI in real time. For training our AI, we also consider the latest approaches to AI explainability (»Explainable AI«). For this purpose, we train our AI models using our own data (Data Privacy) in our AI lab in Hamburg and for the context of commercial vehicles and mobile machinery (Reliable AI). We anticipate emerging AI standards for safety-critical applications in commercial vehicles and mobile machinery and work closely with leading universities.

The AI runs »embedded«, directly on the camera, without additional hardware, saving space. Communication with the vehicle occurs via CAN-Bus or GPIOs. With our Safe Vision AI Frame-work, we are safety ready and enable deep integration into your vehicle.

LUIS SAFE EDGE AI

Safety features for even more safety

The LUIS SAFE EDGE AI reliably detects people and provides multi-level warnings to prevent collisions. The AI operates on secured hardware and has been trained using our own data in our AI lab in Hamburg, specifically for the context of commercial vehicles and mobile machinery. Moreover, the MLOps workflow and training methods are based on the latest scientific approaches and comply with emerging standards and the EU AI Act. With the LUIS SAFE EDGE AI camera, we are introducing the first AI camera with safety features and diagnostic options to the market, setting a new industry standard. Our goal is to integrate it even deeper into our customers' vehicle architectures, enabling intervention in the vehicle (acceleration, braking) or the work process (autonomy).

Safe Features

- Safe Startup
- Dirt detection
- Safety MCU
- Safe IO's
- Safe CAN Communications
- Front Heating
- Alive Check
- QR-Reading
- SOME/IP Ready

LUIS EDGE AI

Rugged cameras with AI for person detection

The robust LUIS EDGE AI cameras distinguish people from other obstacles in real time and warn the driver of collisions without triggering unnecessary alarms. These systems are particularly effective in tight driving situations, helping to prevent collisions with individuals. They remain operational in harsh environments and perform object detection directly on the camera, without requiring additional hardware. Customizable detection zones and warning mechanisms allow for flexible integration into the vehicle.

LUIS SAFE EDGE AI

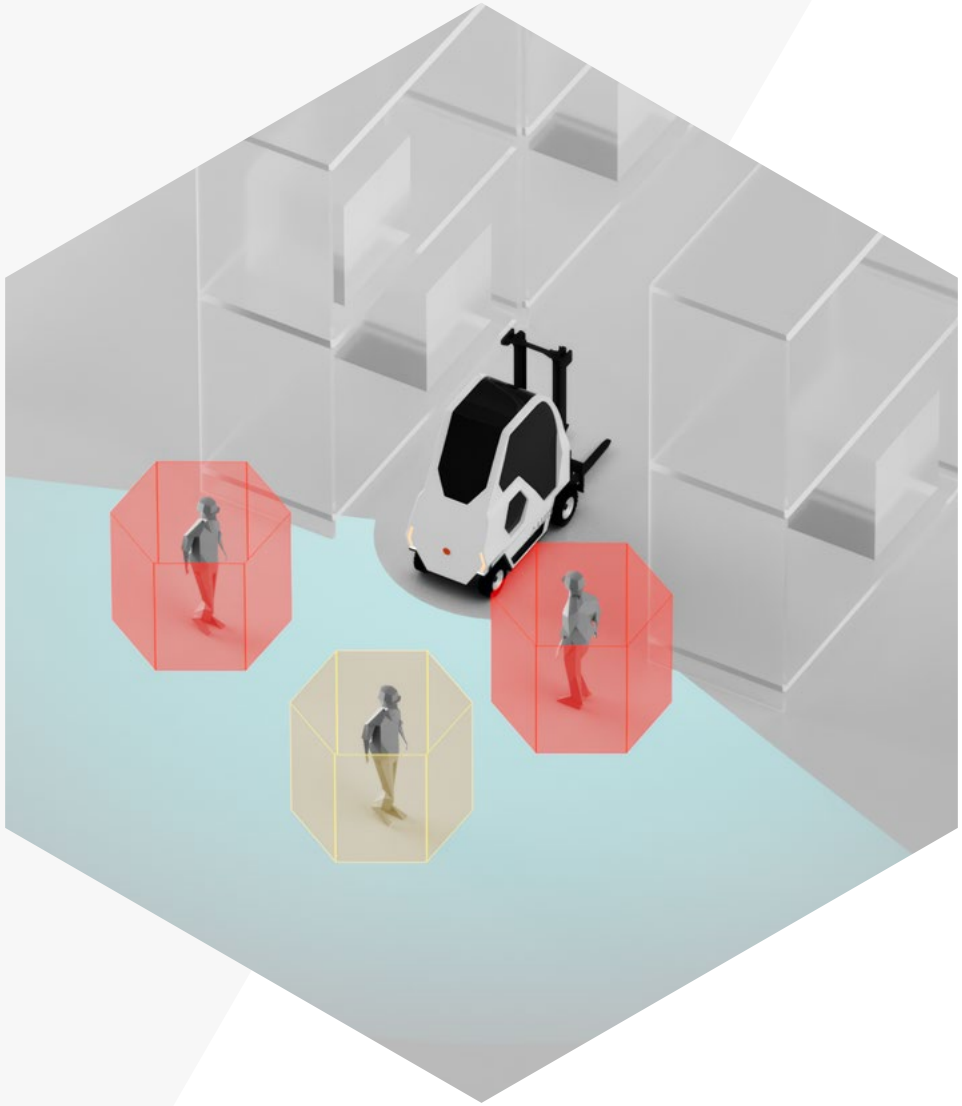
Digital 5-megapixel camera (TX or T1)

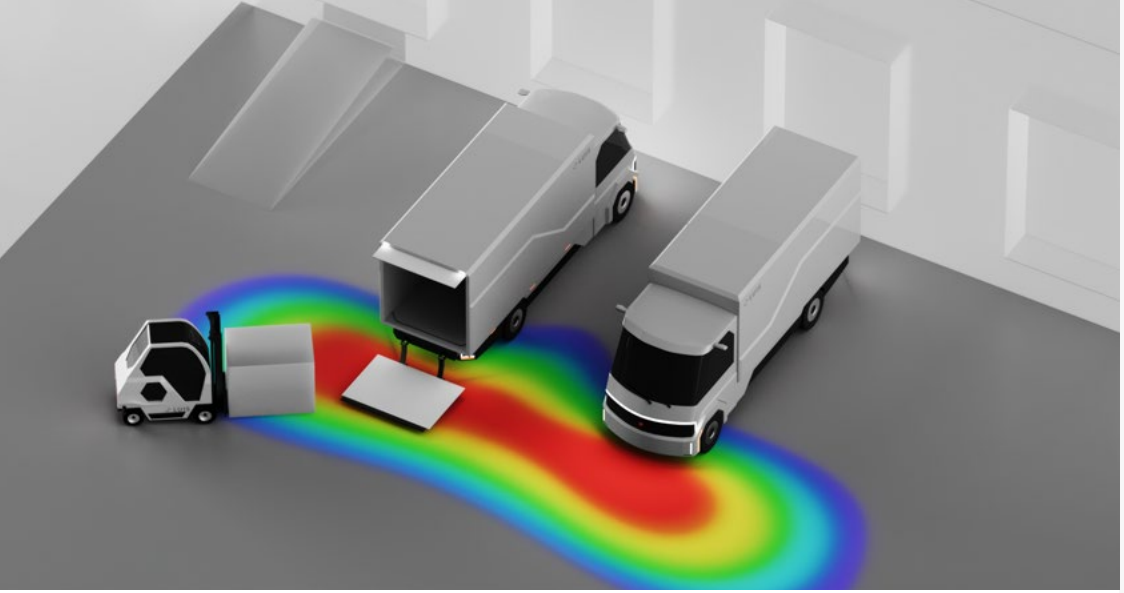
- 1/3" CMOS sensor
- Resolution: 5 MP
- Horizontal viewing angle: 135°
- Latency: < 130 ms
- MJPEG, H264, H265, IP, TCP, HTTP, RTSP, RTP
- Water and dust resistant: IP69k
- Fast Ethernet: 100BASE-TX / BroadR-Reach: 100BASE-T1
- AI processing up to 2.1 TFlops
- CAN interface for improved vehicle integration
- Input for camera configuration
- Up to 3 configurable outputs for warning zones
- Setting warning zones, video formats, AI confidence features, and alarms
- Shock and vibration resistant
- Heating
- Audio output
- DC 12 V / 24 V (10–32 V)

LUIS EDGE AI

Analog Full HD variant (AHD)

- 1/3" CMOS sensor
- Resolution: 2 MP (Full HD)
- Horizontal viewing angle: 140° (additional options available upon request)
- Latency: < 120 ms
- Frame rate: 25 and 30 FPS
- Water and dust resistant: IP69k
- Shock and vibration resistant
- Alarm trigger output
- Easy configuration via Wi-Fi, including setting warning zones and alarm sounds
- Heating (optional)
- CAN interface (optional), RS232 (optional)
- DC 12 V / 24 V (10–32 V)





LUIS SMART PREVENT

Detection and analysis of hotspots

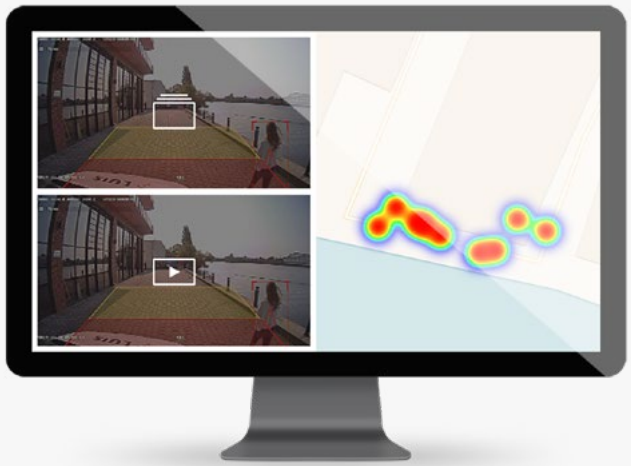
Description of the System

The LUIS SMART PREVENT system detects and analyzes danger spots in combination with LUIS products. The GPS coordinates are saved and collected in the event of corresponding hazard messages, such as the detection of a person in the danger zone with the LUIS EDGE AI camera. The aim is to identify danger spots in certain regions at an early stage, make them visible and proactively defuse them – before accidents occur.

The collected geo-coordinates are used to offer various analyses. In a heatmap, for example, all danger spots are directly marked to identify the most dangerous areas. Images and videos of the detecting event can also be used to draw precise conclusions as to what measures need to be taken. Accurate analytics allow you to track and evaluate the impact of your actions on a daily basis.

Quality Features

- Connection to many different LUIS systems such as the LUIS EDGE AI camera, LUIS TURN DETECT, or third-party systems with trigger options
- Remote access to images and videos to preserve evidence
- Accurate data analysis such as detections per vehicle or detections of different detection zones
- API integration into existing IT/ERP applications



Prevention of fatal accidents

In 2023, four people were hit and fatally injured by industrial trucks on company premises in Germany alone

18.491
REPORTABLE ACCIDENTS

294
NEW ACCIDENT PENSIONS

7
FATAL ACCIDENTS

Source: DGUV report 2023, page 85

LVDS T1 TX

< 60 MS

IP 69K

ECE R158

Digital cameras

Cameras for the highest demands

At the Hamburg location, LUIS develops state-of-the-art digital camera systems specifically for use in commercial vehicles and mobile machinery. Our portfolio includes a variety of camera types that meet the highest demands.

Lossless and low-latency image transmission

Our LVDS cameras transmit raw data at speeds of up to several gigabits per second, allowing the uncompressed image to be further processed without loss. We offer Ethernet cameras in both Fast-Ethernet (100BASE-TX) and BroadR-Reach (100BASE-T1) versions. These cameras transmit images with low latency, compressed (H264/H265/MJPEG) and processed (e.g., white balance adjustments).

7" 10" HD

TOUCH-SCREEN

QUAD-SCREEN

Digital monitors

Brilliant visibility

We offer high-performance digital monitors for LVDS or Ethernet camera systems to complement our digital cameras.

These high-resolution monitors feature a glare-free screen that ensures perfect visibility even in bright light, strong glare, or darkness.
Mechanical shocks or vibrations? Our monitors are unshakable. Thanks to their streamlined design, they boast ultra-fast boot-up and image rendering times. They are the ideal display devices for camera images and serve as a great addition to your terminal display.

We offer monitors ranging from 3.5 to 10 inches. Our HD monitors are specifically designed for rearview cameras and 360° systems, with some models supporting the connection of multiple cameras. We provide both wired and wireless monitor options.

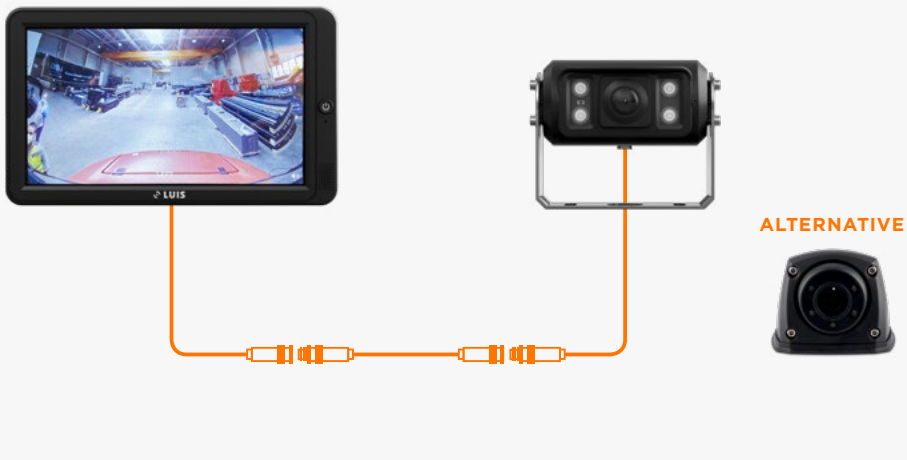
Key Features

- LUIS 7- or 10-inch monitor with touchscreen
- Resolution: 1,280 x 768 pixels (7-inch) and 1,280 x 720 pixels (10-inch)
- Brightness: 1,000 cd/m²
- Optional quad-split-screen
- 1 to 4 video inputs
- Integrated speaker
- I/O ports: 4
- IP 30, IP 67 (waterproof variant)
- Tested according to UNECE-R118

LUIS fork-mounted or fork-carrier camera

High efficiency in positioning goods

A LUIS fork-mounted or fork carrier camera system provides improved visibility along the fork. This allows for optimal positioning of goods and significantly increases productivity. Additionally, LUIS industrial truck systems greatly enhance ergonomics. With such a system, the driver gains a direct view of the forks and no longer has to strain their neck to look upwards. Thanks to highly sensitive CMOS sensors, the cameras deliver the best possible image quality even in challenging lighting conditions. The cameras are mounted either on the inside of the fork of a reach or forklift truck or on the fork carrier. They are powered by the vehicle's onboard voltage or an interchangeable battery. The image transmission to the monitor occurs via a low-latency, secure, and end-to-end encrypted digital radio connection.

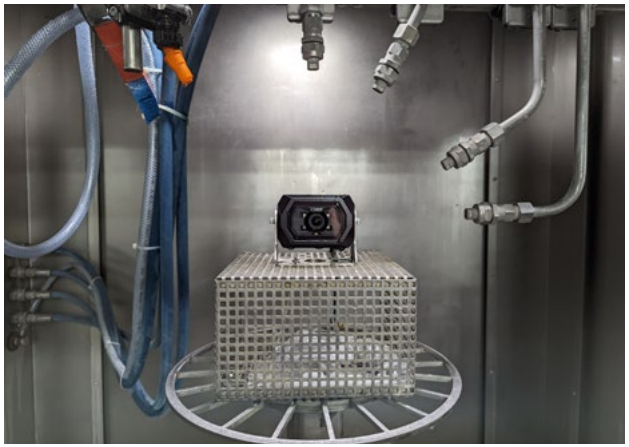


LUIS rear and front monitoring

Preventing workplace accidents through improved visibility

The main cause of workplace accidents is limited visibility around industrial trucks. In practice, forward visibility is often significantly restricted when transporting a load. Due to constant maneuvering in narrow aisles, unobstructed rear visibility is also a key feature for high safety around industrial trucks. Equipping forklifts with camera systems significantly enhances safety. This provides the driver with direct visibility of the path in front of and behind the vehicle.

The LUIS camera solutions are optimally designed for these areas. With the LUIS wide-angle camera, the driver receives a high-resolution Full HD image of the entire rear area (170° field of view). Thanks to modern night vision technology, the driver can monitor the rear of the vehicle even in complete darkness (down to 0 lux). The rugged construction of the camera also ensures it can withstand cleaning with a high-pressure washer.



Nothing can shake it

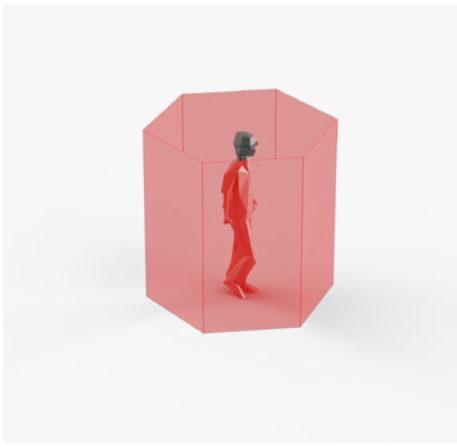
Innovative solutions for challenging use

LUIS products are designed for challenging use. Only components that meet these high standards and quality requirements are used.

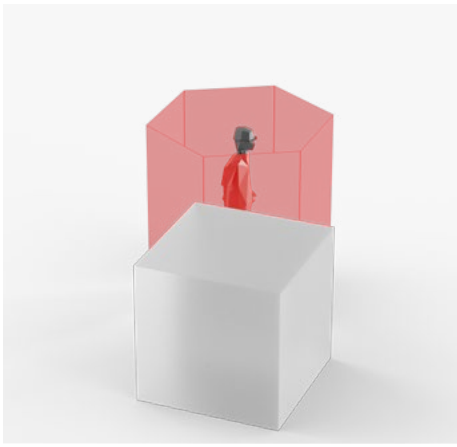
Special features include the robust stainless steel brackets and roofs of the cameras, as well as the solid, internally cast aluminum die-cast housings with glued screws and washers. Consequently, LUIS cameras meet the highest protection class IP69k for water and dust resistance. They can also withstand vibrations from 10 to 2,000 Hz and shocks up to 100 G, operating without limitations even at extreme temperatures from -40 °C to +85 °C.

Key Features

- **Solid aluminum die-cast housing**
- **Predominantly robust stainless steel camera mounts and roofs**
- **Camera housing sealed and screws glued**
- **IP69k protection class (certified according to ISO 60529:2014)**
- **Shock-resistant up to 100 G (certified according to ISO 16750-3:2012)**
- **Vibration-resistant from 10 to 2,000 Hz (certified according to ISO 16750-3:2012)**
- **Temperature-resistant from -40 to +85 °C (according to ISO 16750-3:2012)**
- **Operating voltage 9 to 32 V DC**
- **Certified according to CE, ECE R10 (E-Mark), RoHS, and REACH**



Pedestrian detected at 5 m



Partially hidden pedestrian detected at 5 m

Performance Artificial Intelligence (AI) by LUIS

AI machine vision in real time

At LUIS, we leverage our extensive AI expertise to develop cutting-edge machine vision, advanced image processing, and artificial intelligence applications tailored for mobile machinery. Our goal is to meet the rigorous demands of key sectors, including agriculture, construction, waste management, and logistics.

Our AI solutions are diverse, extending beyond driver assistance systems to support increasingly automated work processes. Every application runs embedded directly on the device, eliminating the need for background servers and ensuring seamless operation in real-time.

LUIS provides a comprehensive toolkit that includes software, simulation algorithms, and in some cases, pre-trained neural networks, all designed for specific use cases. To efficiently train large datasets, we utilize a robust GPU-powered training pipeline, applying the latest techniques to minimize training efforts and maximize performance.

LUIS Embedded Vision

and Artificial Intelligence

With our Embedded Vision and AI solutions, a wide range of applications across different industries can be solved, including person detection, utilizing 3D algorithms and sensor fusion.

In logistics, for example, these include measuring available loading space, label recognition, and identification of containers and goods. In agricultural machinery, our solutions enable monitoring of fill levels, recognition of plant rows, targeted fertilization, and real-time assessment of harvest quality. For construction machines, our smart cameras and embedded AI solutions assist with (semi)automated tipping, loading, milling, paving, as well as digging and drilling. In municipal vehicles, in addition to monitoring loading and working areas, tasks such as trash can recognition, automated gripping of handles, state monitoring, and automatically adjusting suction power for heavy objects can be performed.

To achieve this, we use real-time image processing, pattern recognition, object detection, and the fusion of diverse environmental data from mono and ToF cameras. We also provide customer-specific data for (semi)autonomous machine control or overlay displays to assist machine operators.

MOVING
SAFELY

We are here for you

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