

Enhancing the sensing landscape in Industry

Technologies for Industry 5.0 applications

am u OSRAM

Access control & security monitoring



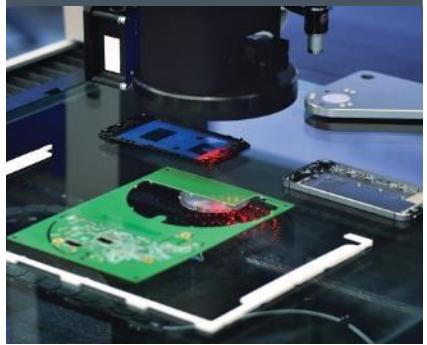
Industrial IoT & automation



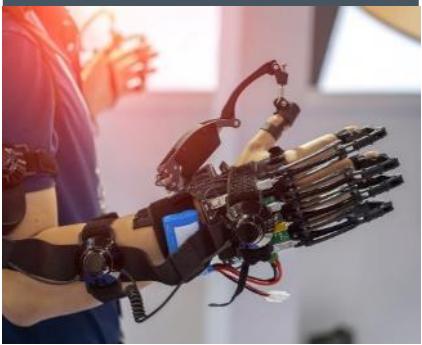
Near-infrared spectroscopy



Industrial imaging, machine vision



Robotics



UV-C disinfection



Factory automation, robotics & Industry 5.0

Factory automation, robotics & Industry 5.0

- Sensors for Robotics, Internet of Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML)
- Autonomous guided vehicles (AGV) and warehouse robots
- Collaborative robots (cobot) for human interaction
- Medical robots
- Consumer robots
- Industrial controls (knobs, potentiometer, stepper motors, Brushless DC motors (BLDC)
- Machine vision (Image sensors and illuminators) for factory inspection and automation.



Position/Capacitive/Temperature Sensing:

Factory automation, Robotics & Industry 5.0

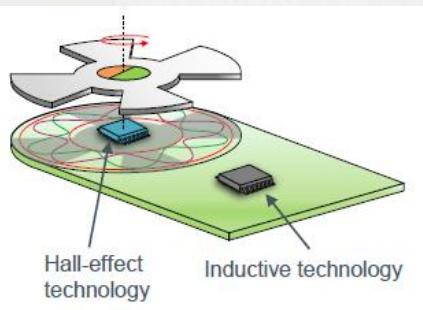
- Magnetic Position Sensors

[AS5600-ASOM](#) 12-bit on-axis rotary position sensor for robotics, drones, industrial. *LONGEVITY program with availability until 2031!*

[AS5047D-ATSM](#) 14-bit high speed position sensor. Immune to stray magnetic fields.

- Inductive Position Sensors

[AS5715R-ZTST](#) Inductive, off-axis, motor control position sensor.



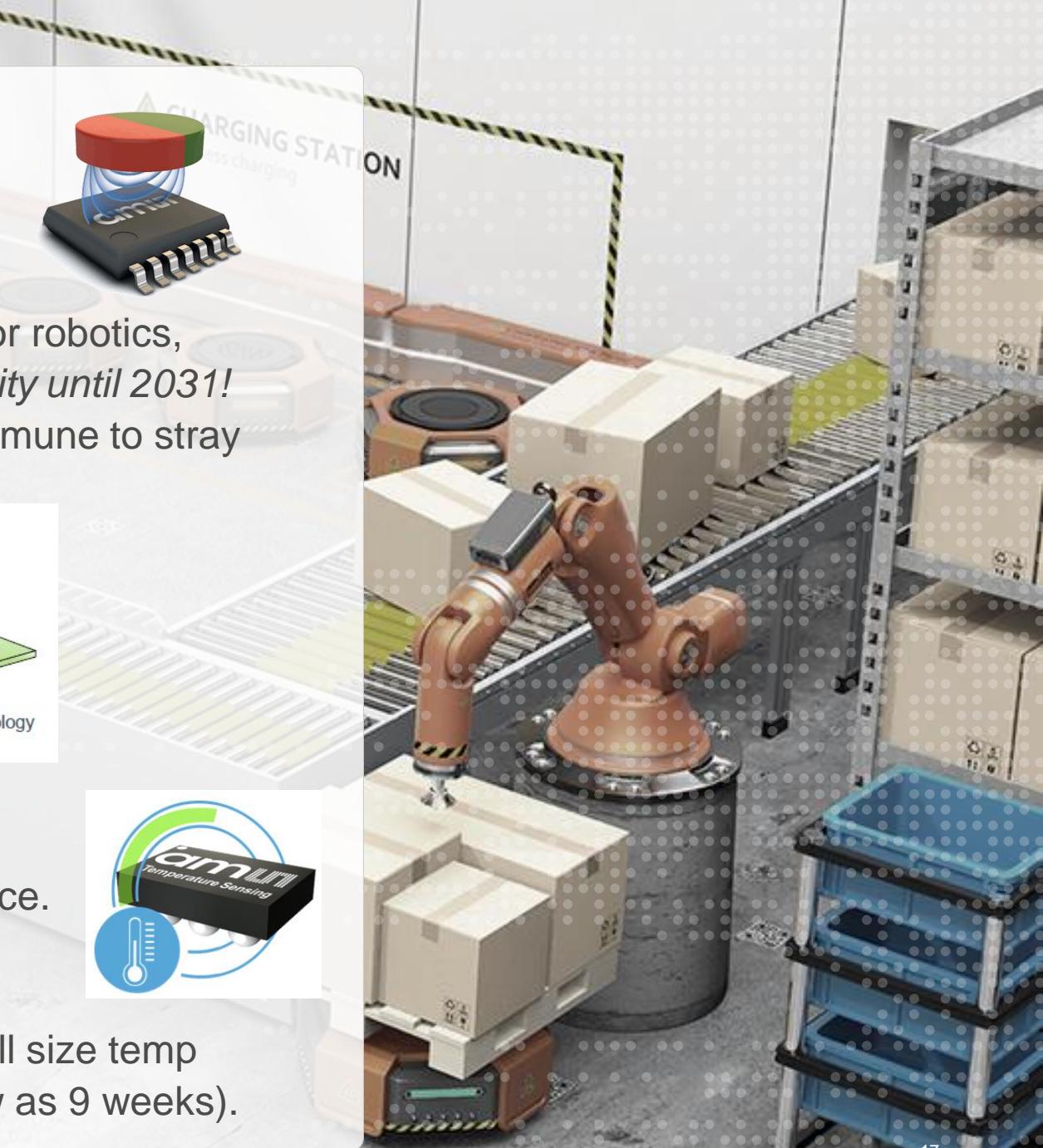
- Capacitive Sensors

[AS8579-ASSM](#) 10-channel cap presence detection. Can be used for fluid level, pressure, proximity and force.



- Digital Temperature Sensors

[AS6221-AWLT-S](#) High accuracy, ultra low-power, small size temp sensor with alarm. Now with shorter lead times (as low as 9 weeks).



Time-of-Flight Sensing: Factory automation, Robotics & Industry 5.0

- [**TMF8801**](#) (TMF8801-1BM) 1D Direct Time-of-Flight Sensor.
Integrated VCSEL laser and photon detector.

• Distance Ranging (ToF)

- ✓ Autonomous User Presence Detection
- ✓ Object Detection
- ✓ Collision Avoidance

Proximity Detection

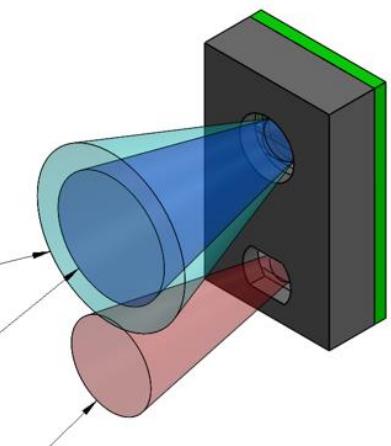
- ✓ Turn on/off of Display based on User Presence
- ✓ Motion/Proximity sensing (shut off system if too close or dead object)

Trigger Sensing

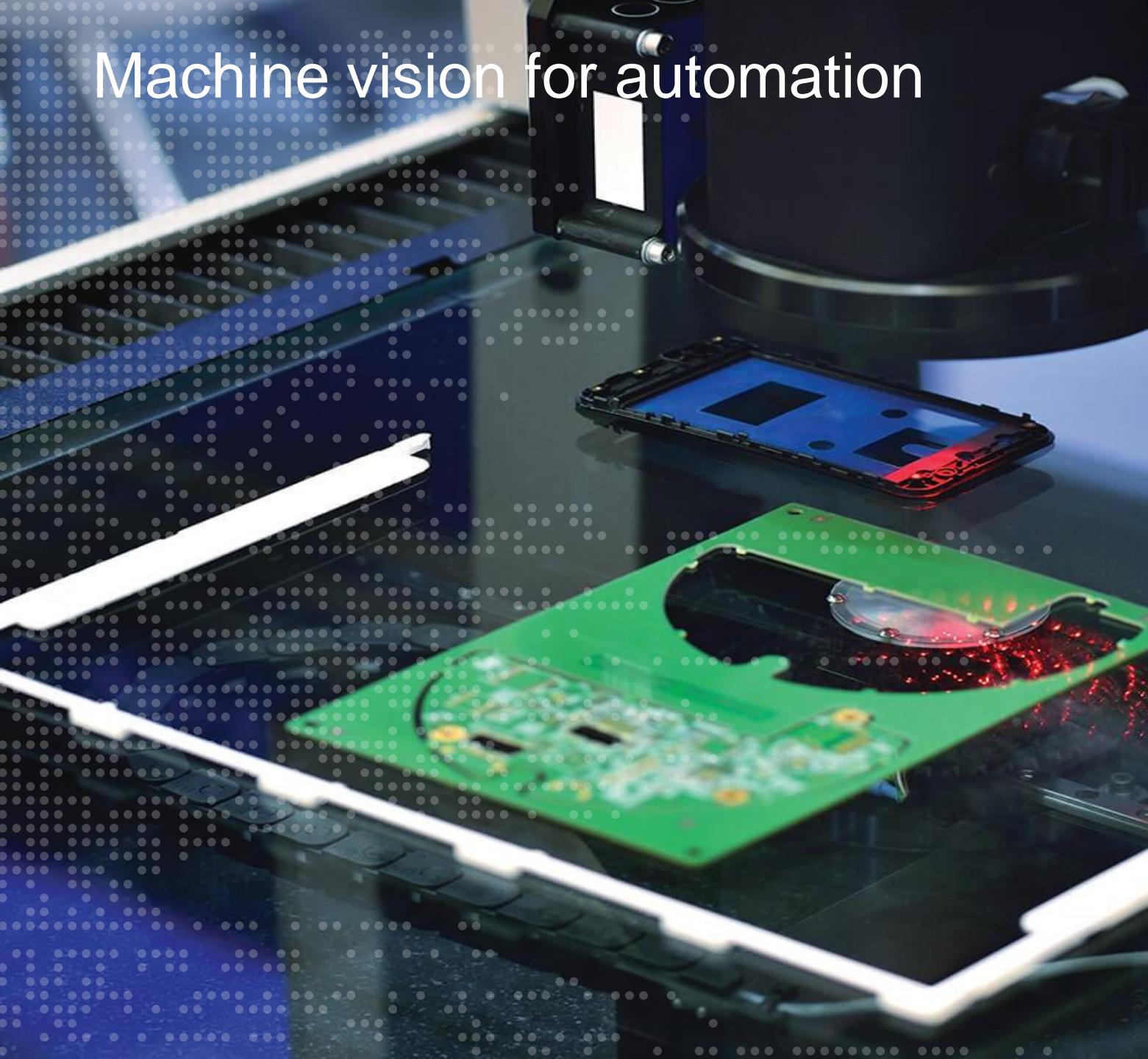
- ✓ Drone - Ceiling /Floor detection, Landing
- ✓ Door open / presence detection

Simple Gesture Recognition

- ✓ Swipe and Tap gestures



Machine vision for automation



Machine vision for automation

- Leading global shutter CMOS imaging technology for high-speed machine vision, inspection and factory automation
 - High resolution, high frames per second, and image quality
 - Automatic optical inspection for quality control
- Leading VCSEL and high quantum efficiency NIR image sensors
- Near infrared illumination combined with sensitive NIR image sensors
- Enables compact, cost effective and high-performance 3D systems immune to uncontrolled illumination conditions
- Accurate 2D and 3D surroundings visualizations of for more complex tasks

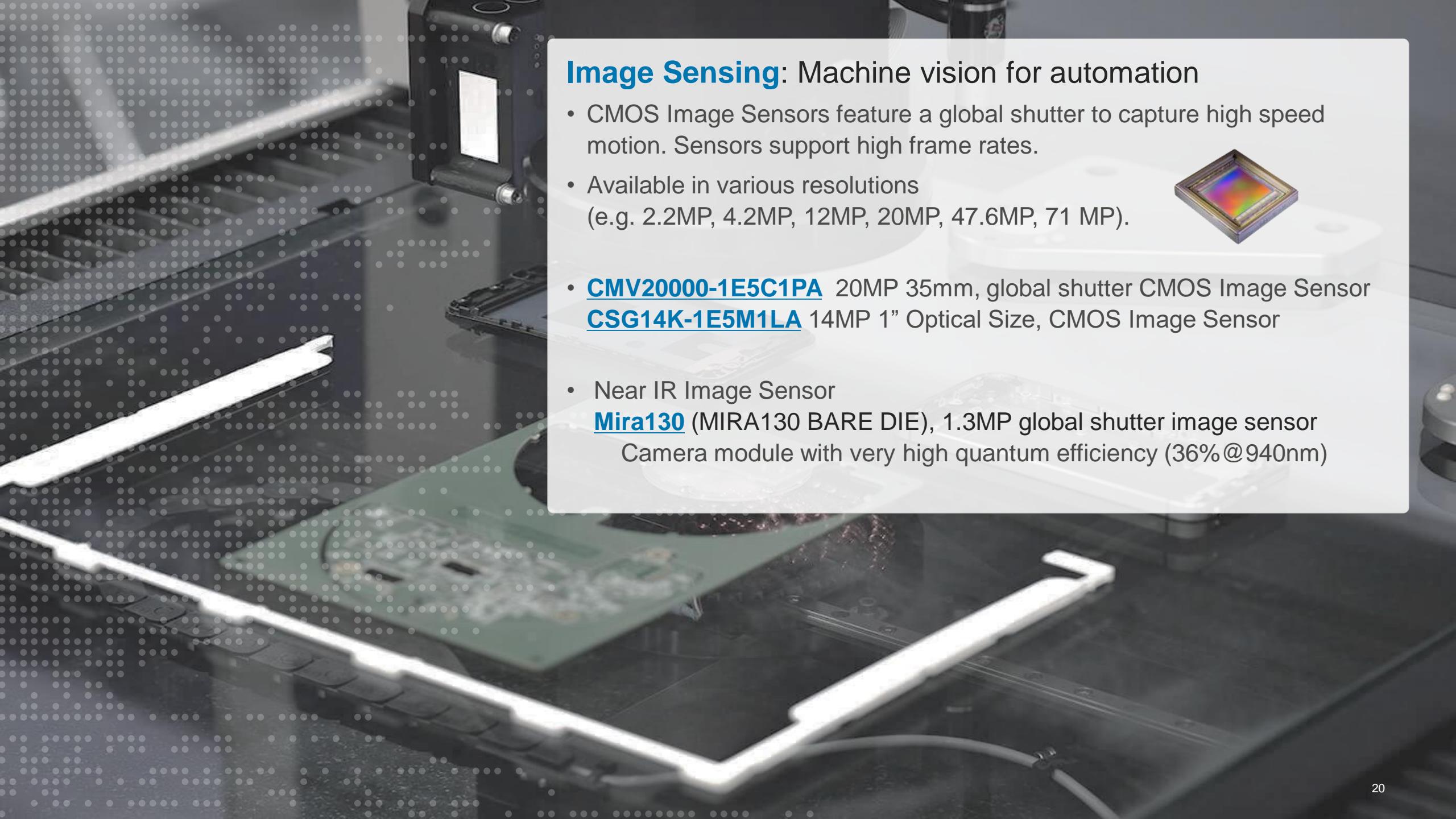
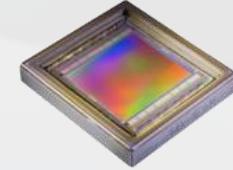


Image Sensing: Machine vision for automation

- CMOS Image Sensors feature a global shutter to capture high speed motion. Sensors support high frame rates.
- Available in various resolutions (e.g. 2.2MP, 4.2MP, 12MP, 20MP, 47.6MP, 71 MP).
- [**CMV20000-1E5C1PA**](#) 20MP 35mm, global shutter CMOS Image Sensor
[**CSG14K-1E5M1LA**](#) 14MP 1" Optical Size, CMOS Image Sensor
- Near IR Image Sensor
[**Mira130**](#) (MIRA130 BARE DIE), 1.3MP global shutter image sensor
Camera module with very high quantum efficiency (36%@940nm)

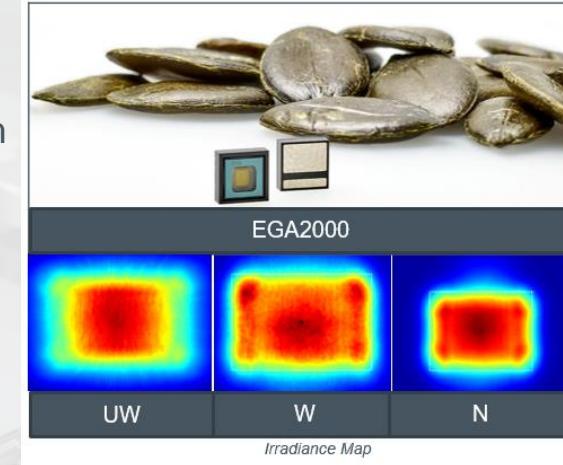


Illumination: Machine vision for automation

- Illuminator pairs with Image sensor or ToF

- Use cases:

3D Machine Vision, Smart Warehouse Management
Optimized logistic storage, Volume Measurement System
Enhanced Night Surveillance, Contactless Door Lock
Smart Cleaning Robot, Smart Refrigerator
Smart Speaker, Secure Payment, Smart Banking,
Home Delivery Robot, Human Traffic Monitoring
Building Access Control, Fast Airport Access
Object Avoidance, VR/ AR Glass



- **EGA2000** Flood Illuminator (ASBX-00-MQ)

High power (4W) uniform NIR flood illuminator @ 850 nm or 940 nm

- **PMSILplus** (MPN tbd) NIR flood illuminator for 2D imaging

+ Rectangular, highly uniform field of illumination, Best in class VCSEL for high efficiency enabling long battery life, Includes integrated eye safety

- **Belago1.1** (AQAA-20) High contrast, focus free 5k random dot pattern projector.

Built with micro lens array (MLA), Integrated eye safety



Infrared Lasers for Industry Applications

Infrared Lasers for Industry Applications

- Automated Guided Vehicles for last mile delivery. Works in conjunction with 3D sensing systems.
- Industrial sensing for distance and object detection as well as size and shape control.
- Traffic surveillance for toll systems and speed enforcement
- Vacuum cleaning robots for environment mapping and object detection
- Laser rangefinder for golfers, hunters and military



Infrared Lasers for Industry Applications

- Edge Emitter Lasers

Radial T1 3/4, SPL PL90 [here](#)

@25W, 905 nm, (THT Plastic)

Radial Smart Laser, SPL LL90_3 [here](#)

@70W, 905 nm, 3xEmitters, (THT Plastic)

Metal Can® TO56, SPL UL90AT08 [here](#)

@125W, 905nm, (T056 metal can)

Chip, SPL DS90A_3 [here](#)

@125W, 905nm, (bare die SMT)

- Near IR Image Sensor

Mira130 (MIRA130 BARE DIE), 1.3MP global shutter image sensor with very high quantum efficiency.

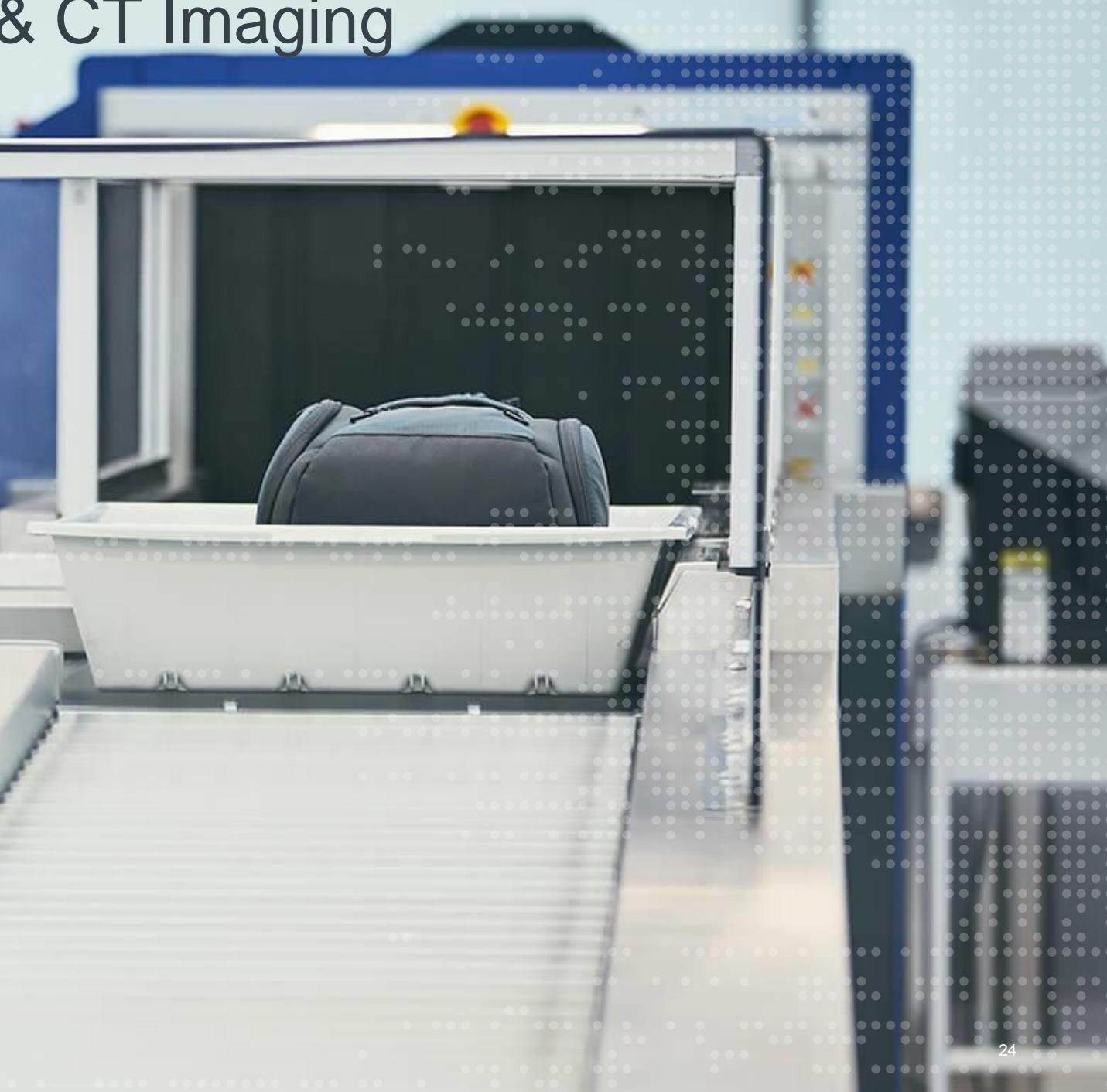
- 1D Direct Time-of-Flight Sensor

TMF8801 (TMF8801-1BM) Presence detection, distance, ranging and collision avoidance

Precise Industrial X-ray & CT Imaging

Precise Industrial X-ray & CT Imaging

- X-ray for security and safety: airports, factory production lines, non-destructive quality control of engine components, food inspection, security inspection, precise quality assurance
- Solutions include current-to-digital converters for line and CT scanners and flat panel readout ICs for industrial X-ray applications
- Enables high-precision and fast image acquisition, reliability, high-sensitivity, and low power consumption



Precise Industrial X-ray & CT Imaging

(Coming soon to Disti)

- SECURITY X-RAY

- Carry-on & Checked Luggage
 - [AS5850A](#)** Digital X-Ray
 - Flat Panel Readout IC

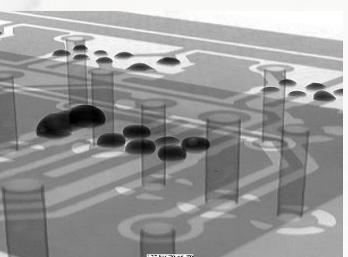


- INDUSTRIAL CT (Computed Tomography)

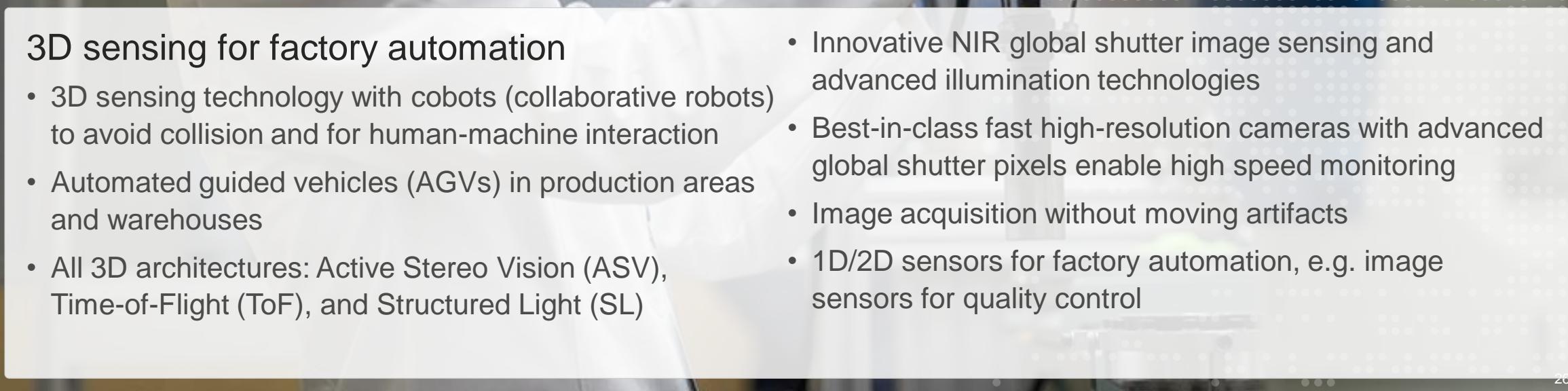
- Oil & Gas Welding Non-Destructive Testing (NDT)
- Semiconductor NDT
- X-Ray Food Inspection

[AS5900](#) Multichannel CT Detector Interface

[AS5950](#) Multichannel Low-noise CT Sensor Chip



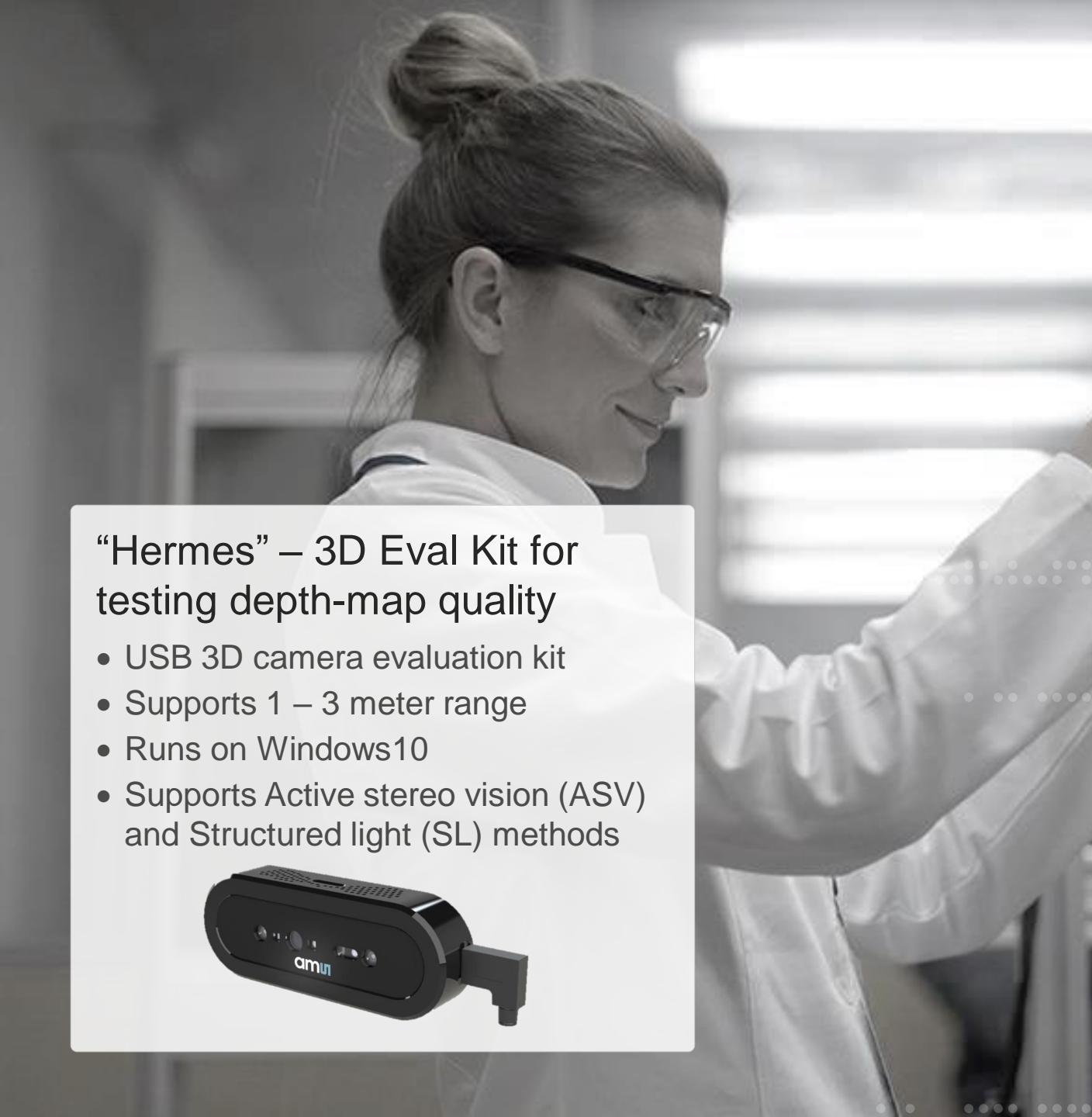
3D sensing for factory automation



3D sensing for factory automation

- 3D sensing technology with cobots (collaborative robots) to avoid collision and for human-machine interaction
- Automated guided vehicles (AGVs) in production areas and warehouses
- All 3D architectures: Active Stereo Vision (ASV), Time-of-Flight (ToF), and Structured Light (SL)

- Innovative NIR global shutter image sensing and advanced illumination technologies
- Best-in-class fast high-resolution cameras with advanced global shutter pixels enable high speed monitoring
- Image acquisition without moving artifacts
- 1D/2D sensors for factory automation, e.g. image sensors for quality control



“Hermes” – 3D Eval Kit for testing depth-map quality

- USB 3D camera evaluation kit
- Supports 1 – 3 meter range
- Runs on Windows10
- Supports Active stereo vision (ASV) and Structured light (SL) methods



3D sensing for factory automation

[Belago1.1](#) (AQAA-20) dot projector for 3D imaging

- + High contrast, focus free 5k random dot pattern
- + Built with micro lens array (MLA) to provide unique cost/performance ratio
- + Integrated eye safety

[PMSILplus](#) (tbd) flood illuminator for 2D imaging

- + Rectangular, highly uniform field of illumination
- + Best in class VCSEL for high efficiency, hence long battery life
- + Integrated eye safety

[Mira130](#) (MIRA130 BARE DIE)

1.3MP global shutter image sensor

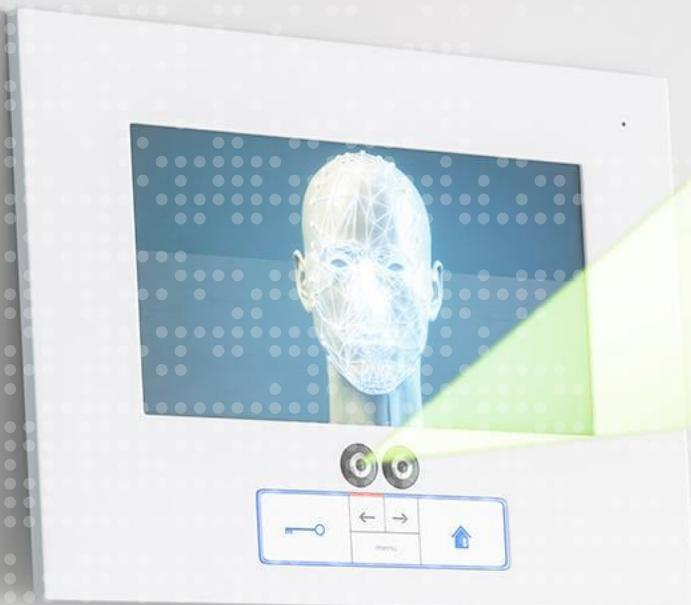
- + Camera module
- + Very high quantum efficiency (36% @ 940nm) for optimized range and power consumption

[TMF8801](#) (TMF8801-1BM)

1D Direct Time-of-Flight Sensor

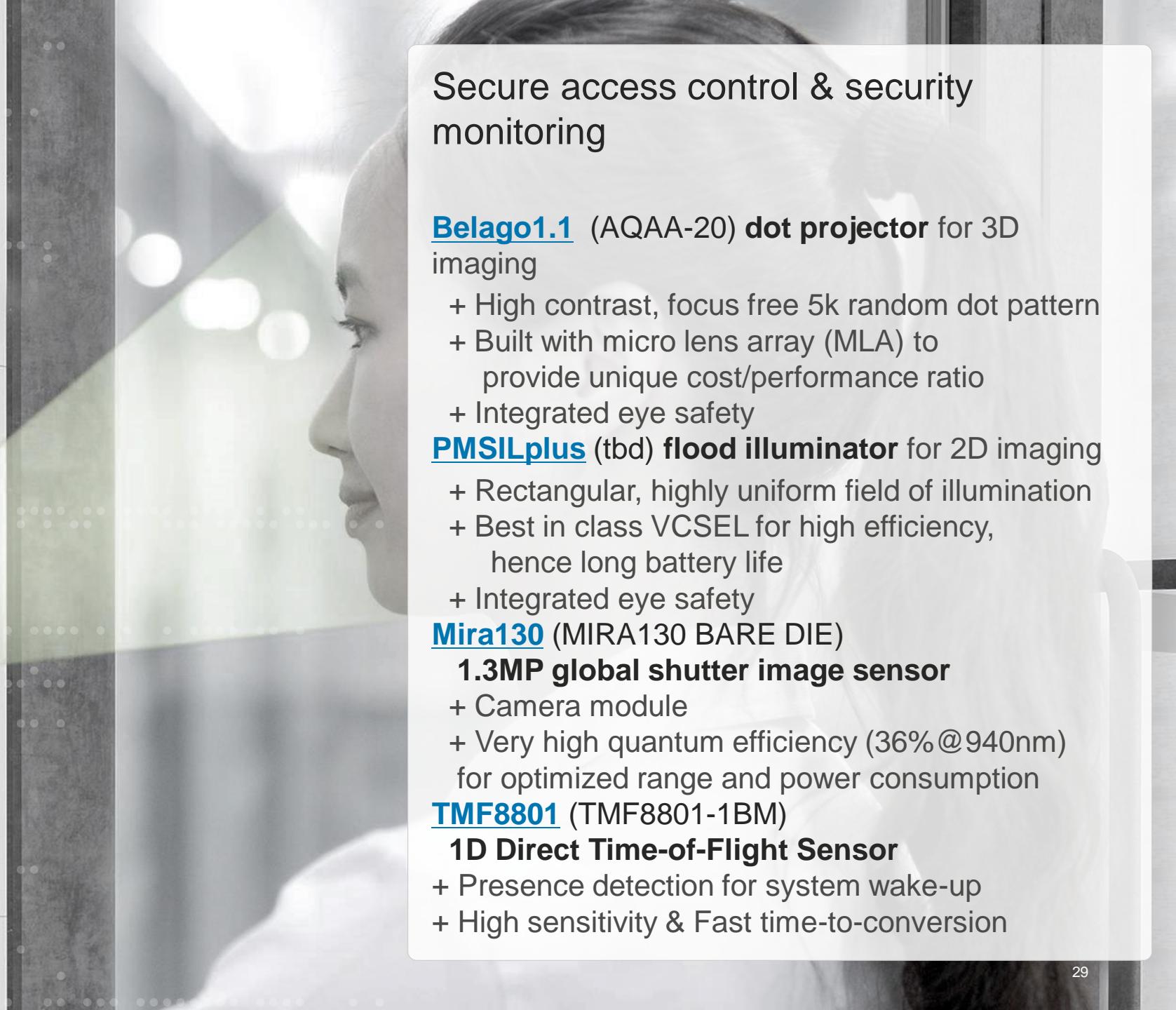
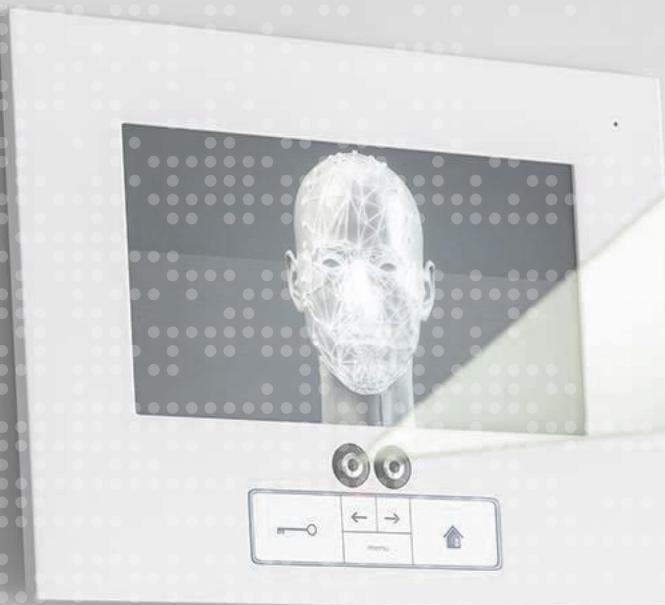
- + Presence detection for system wake-up
- + High sensitivity & Fast time-to-conversion

Secure access control & security monitoring



Secure access control & security monitoring

- 3D face ID authentication sensing solutions for use in residential or commercial building access
- Different 3D sensing architectures: Active Stereo Vision (ASV), Time-of-Flight (ToF), Structured Light (SL)
- Compact Infrared illumination products for camera systems enable wide-range security monitoring benefitting public safety
- CCTV, video cameras, vehicle registration plate recognition



Secure access control & security monitoring

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