VISION
Guided Tour
2024

Food & Beverages
9 October 2024

VISION
MARKETS

High-speed focus and 3D imaging by pixel level image sensor and liquid lens

Booth: Hall 8, A34

Targeted end-user applications

Inspection and categorization.

This innovation integrates a programmable pixel-level computing image sensor with a tunable-focus liquid lens to form a compact high-speed autofocus and depth perception system.

Using this system, the food and beverage in production, and categorize in gathering accurately, quickly and cost effectively.

What you will see at our booth:

The camera with pixel level computing image sensor and liquid lenses. Through the demo, the vertical users can see the processing speed, accuracy and discuss how to implement to variant applications.

IOIP CHINA
Charles Chang,
charles.chang@fortron-source.de

Technological benefits

- Speed and Efficiency: Operates at over 500 fps with latency below 2 milliseconds, suitable for high-speed applications. Total system latency is under 50 milliseconds, consuming less than 1 watt of power.
 - Compact and Lightweight: Integration, processing, and focus control within a single module, reducing the need for external resources.
 - High-Resolution Depth Information: Achieves less than 1 millimeter depth map reconstruction at over 30 fps, ideal for precise applications ling and industrial inspection.
 - Flexibility: Handles multimodal data efficiently, combining conventional image processing with advanced deep learning algorithms for diverse vision applications.

The Innovation

Sensor and Liquid Lens Collaboration: The pixel-level computing image sensor collaborates with the liquid lens to capture images at various focal planes without waiting for stabilization. The sensor evaluates contrast and sharpness, identify focal plane. This integration ensures high-quality images and depth data with minimal latency and power consumption.

Links:

www.ioipshare.com

Imaging module solutions for food sorting and beverage inspection markets

Booth: Hall 8, B10

Targeted end-user applications

Smart camera makers seeking user-friendly MIPI imaging modules for 2D and 3D vision, which are compatible with embedded platforms such as NXP, NVIDIA and QUALCOMM. Typical applications:
 * Inspection and sorting of raw food, fruits, vegetables, meats, fats and oils, packaged and dried food products
 * Beverage inspection: bottle quality control, fill level inspection, and cap and cork inspection
 * Automatic vending machines
 * Packaging integrity inspection
 * Parcel and carton dimensioning

TELEDYNE | Teledyne e2v

TELEDYNE
Laurent APPERCEL, Maxime TAUPIN
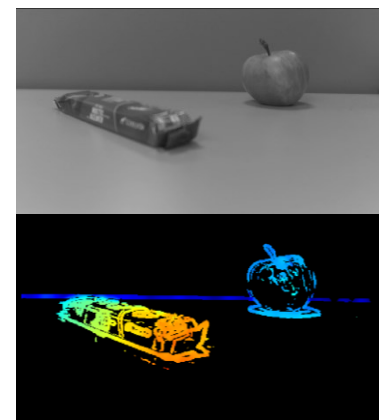laurent.appercel@teledyne.com
maxime.taupin@teledyne.com

What you will see at our booth:

Teledyne e2v will present live demonstrations of the Optimom™ 2M autofocus and Optimom™ 5D for short-distance 3D vision, both connected to the NVIDIA vision platform.

Technological benefits

Teledyne e2v's Optimom™ imaging modules feature an ultra-fast auto focus (1 millisecond), allowing to take multiple frames at different focus ranges. This turnkey solution is factory focused and calibrated, making it ready for integration via the well-established MIPI interface. Additionally, a specific long-distance option enables MIPI connectivity of up to 15 meters.

Teledyne's new Optimom™ 5D provides a truly innovative and unique solution for affordable 3D vision at short distances (from 5cm to 1.5 meters) without optical occlusion and working under ambient lighting conditions.

The Innovation

Teledyne e2v's Optimom™ modules are available with existing development kits, sensor drivers, 3D processing SDKs for different SoC platforms (NXP IMX8, Nvidia Jetson Nano and Orin Nano, Qualcomm RB5).

The Optimom™ 2M module offers flexibility with three different versions: no lens, fixed focus lens, and auto\multi focus.
Optimom 5D leverages contrast detection 3D vision technology, enabling easy detection of objects, object shapes, fill levels, and damage to packaging.

Links: Optimom - Teledyne e2v Imaging (teledyne-e2v.com)

Complete IP67 Vision Ecosystem for Food & Beverage Automation

Targeted end-user applications

The Forge 1GigE IP67 camera enhances food and beverage production by offering robust, high-resolution imaging for applications such as quality control, packaging inspection, automated sorting, and machine vision-guided processes. Its IP67-rated protection ensures reliable performance in harsh environments, optimizing efficiency and ensuring compliance with industry standards.

What you will see at our booth:

We will showcase a live demo of the Forge 1GigE IP67 camera, highlighting its integration with various compatible accessories from our comprehensive IP67 ecosystem. This demo will emphasize the camera's real-time imaging capabilities, robust design, and seamless compatibility with other IP67-rated components, demonstrating its effectiveness in food and beverage automation.

Booth: Hall 8, B10

Teledyne FLIR
Farhad Kazi,
farhad.kazi@teledyne.com

Technological Benefits

- Complete IP67 Ecosystem: Supported by a wide selection of IP67 rated components from Teledyne and specialized partners, ensuring seamless integration and robust system performance.
- Compact IP67 Protection: Water-resistant, it withstands rigorous cleaning production environments, ensuring durability and reliability.
- High-Resolution Imaging: Multiple resolutions (1.2 - 12MP) using Sony Pregius sensors provide clear, detailed images, enhancing quality control and inspection processes.
- Real-Time Data Processing: Advanced on-camera features like IEEE1588 protocol for multi-camera synchronization and Lossless Compression (LLC) for higher frame rates and lower bandwidth requirements enable immediate analysis and decision-making.
- Versatile Integration: Compatible with existing 1GigE systems, offering a performance upgrade with a smaller body size and lower deployment costs.
- Robust Data Capture: Onboard processing ensures no-drop image capture and delivery, maximizing efficiency in high-speed applications.
- Power over Ethernet (PoE): Simplifies installation by providing power and data transmission over a single cable, reducing setup time and complexity.

The Innovation

- Complete IP67 Vision Ecosystem: Teledyne provides a comprehensive IP67 vision system with components and accessories from trusted partners like Components Express and Smart Vision Lights, covering all customer needs.
- Compact and Versatile Design: The smaller IP67 cylindrical body size facilitates easy integration and maintenance, while PoE capability enhances flexibility.
- Advanced On-Camera Features: Includes IEEE1588 protocol for multi-camera synchronization and Lossless Compression (LLC) for efficient data transfer without compromising image quality.
- Auto-Brightness Adjustment: Features auto-brightness functions (AGC and Auto-Exposure) for dynamic adjustments in varying lighting conditions, crucial for consistent quality control.
- Teledyne GigE Framework: Integrated with the highly reliable Teledyne GigE framework within the Spinnaker® 4 acquisition SDK, and support for Sapera® Image Processing Library with AI capability.

Links: *https://www.flir.com/iis/machine-vision/forge-1gige-ip67/*

Enhancing Food Quality Assurance with Auto Deep Learning Vision Inspection

Booth: Hall 8, B11

Targeted end-user applications

Neurocle provides comprehensive inspection solutions for food products, including:

- **Foreign Substance Detection**: Identifies dust, particles, mold, hair, and other contaminants.
- **Packaging Inspection**: Verifies sealing, tampering, assembly, and defects in both primary and secondary packaging.
- **Shape & Appearance**: Inspects bottle exteriors, labels, and packaging defects.
- **Date Code OCR**: Accurately reads and verifies production and expiration dates.
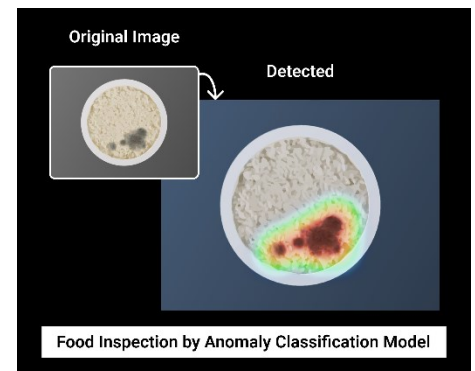
NEUROCLE

Neurocle
Eunseo Kim, info@neuro-cle.com

What you will see at our booth:

We showcase an egg inspection demo

- A **classification model** demo that detects external contaminants and damage, assessing freshness.

This system extends to various food products such as dumplings, bread, potatoes, and mushrooms etc.

Food Inspection by Anomaly Classification Model

Technological benefits

A key requirement in food inspection is the absence of missed detections. While it is important to avoid excessive inspection that leads to false positives, it is crucial to ensure that no defects go undetected. This is directly related to thef the product and impacts customer trust.

Neurocle utilizes an automatically optimized **Auto Deep Learning vision inspection model** that achieves near-zero miss rates, providing highly accurate inspections. Additionally, our **Anomaly model** clearormal standards and identifies any product deviating from these standards as defective.

The Innovation

Neurocle software functions as an expert deep learning assistant, aiding quality inspection managers by preventing food damage and contamination.

Neurocle provides advanced tools that assist quality managers by 2 types of Unsupervised Anomaly Model:

- **Anomaly Classification**: Identifies whether a defect is present.
- **Anomaly Segmentation**: Pinpoints the size and location of defects.

These models can identify not only the presence of defects but also the size and type of defects within the food products. By filtering based on normaomaly model minimizes missed detections.

Links:

https://www.neuro-cle.com/en

Beyond the visible by Toshiba Teli (SWIR & SFD24035 by OneShotBRDF™)

Booth: Hall 8, C27

Targeted end-user applications
(1)SFD(Surface Flaw Detection Scope by OneShotBRDF™ Technology)
 Inspection for mirror material
 Inspection of clack and scratch for lens.
 Inspection of surface quality for plastic card such as the pocket monster's card & credit card etc.
(2)CMOS Based SWIR Camera
 Quality inspection of fruits and vegetables,Foreign object inspection of grains and food processing lines,Light emission inspection of LED etc. and wavelength intensity inspection of invisible range and emperatur.

Toshiba Teli Corporation

Toshiba Teli
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www.toshiba-teli.co.jp

What you will see at our booth:
(1)SFD
 It makes minute surface scratches visible on mirrors and other reflective surfaces, as well as on transparent objects such as lenses. Demo will be given to the metal parts sorting industry and the optical parts inspection industry.
(2)SWIR demonstrate the use of light sources of several wavelengths (1200nm, 1450nm, etc.) and bandpass filters, with subjects that are optimal for each wavelength inspection of food ,fruite,seeds,water,oil.

Technological benefits
(1)SFD
 Conventionally, even with expensive lighting and 3D measurement apps, it was difficult to inspect transparent objects or materials with a mirror finish for scratches, cracks, or chips, and it was necessary to rely on the eyes and judgmperienced worker, and long inspection times were prone to human error, such as misidentification or oversight due to fatigue, and it took a lot of time and money to maintain high quality and efficiency. This technology indicates defects using lors, making it possible to make accurate judgments in a short amount of time without requiring advanced skills.
(2)SWIR
 In the past, using expensive InGaAs sensors to detect objects that were difficult to identify even with visible light carious lighting and measurement apps was avoided due to the high-cost hurdle. However, this CMOS-based SWIR imaging technology makes it possible to inspect the near-infrared region at low cost(recycling, fruit sorting, and food inspection)

The Innovation
(1)SFD
 Toshiba's patented optical technology "OneShotBRDF™" separates scattered light and regular reflected light by color, making it possible to inspect objects that are difficult to distinguish. Furthermore, the optical system and lightintimized to make the system compact.
 (2)SWIR
 TriEye's advanced CMOS-based SWIR sensor has been optimized with Teli's original IP and its unique cooling technology has been used to achieve high quality image output.

Links:
URL: https://www.youtube.com/watch?v=NYduOScOmuE

Food and beverage production and quality inspection with cost-efficient processes

Booth: Hall 8, C60

iDS:

IDS Imaging Development Systems
Sophie Pfalzgraf,
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Targeted end-user applications

Food and beverage manufacturers must become increasingly flexible while controlling costs. Our vision concepts support the production of food and beverages. We offer a broad range of area scan and 3D cameras, cameras with AI-based integrated image analysis software that benefits i.e.
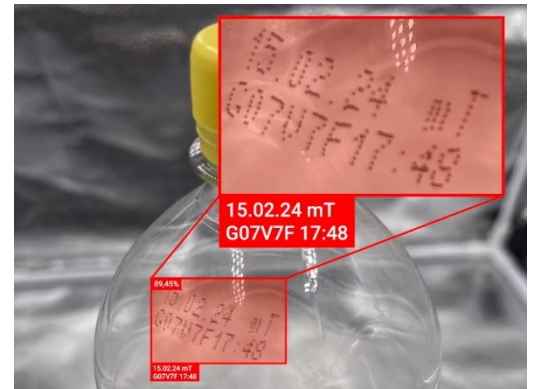
- Checking labels, delivery bills or reading article numbers thanks to barcode reading and OCR.
- Bin picking applications that require precise 3D data at close range and a wide field of view .

What you will see at our booth:

- Budget-friendly alternatives to purpose-built line scan cameras: Line scan application with a standard area scan camera; enables cost-efficient inspection of e.g. the print on cans or bottles.
- Never miss the perfect grip: Robotic bin picking with 3D cameras for part supply in production.
- Get closer than ever: 3D object recognition on short distance with 3D cameras.
- Recognize more than others: Fast and reliable OCR recognition with IDS cameras and AI.

Technological benefits

Whether for 2D, 3D or AI-based tasks, cameras from IDS open up a seemingly endless range of applications. The combination of quality „Made in Germany", long-term availability and exceptional ease of use makes the products unique. Offering a high degree of variety of sensors, interfaces and housing variants. IDS is providing a convenient one-stop-shop experience, offering all accessories like lenses, cables, interface cardeing able to fulfil even highly specialised requests, thanks to more than 25 years of experience in (customized) hard- and software development.

The Innovation

- Huge USB or GigE camera portfolio: from entry-level to high performance with state-of-the-art sensors e.g. Sony Starvis2.
- Cost-free, highly versatile SDK; regular firmware updates for feature extensions; unique software features, e.g. line scan modus for area scan cameras.
- Uniquely broad 3D camera portfolio: models for close range applications yet with large field of view (distances close to 20 cm) up to models for distances up to 5 m with proven fast and precise 3D point clouds. Strong for static and moving objects; also with reflective and non-structured surfaces.
- DENKnet AI: Use of most reliable and advanced OCR technologies. Handle special characters, difficult-to-read fonts, cluttered backgrounds and much more with exceptionally high accuracy.
- New @ VISION: 2024
  2D camera with event-based sensor - IDS first iToF camera – new camera category for industrial monitoring applications (with streaming / recording) – USB 10 Gbps showcase.

Links:

https://en.ids-imaging.com/vision-2024.html

Special lenses for all-round inspections with one camera in the F&B sector

Booth: Hall 8, D48

Opto Engineering
Beatrice Danese, press@opto-e.com

Targeted end-user applications

Being able to perform a 360° inspection of an object is a recurring need in the F&B industry. Opto Engineering 360° view lenses accurately image the inner or outer sides of cylindrical objects with a top-down view using one single camera. Typical all-round controls include:
 - Label inspection on F&B primary packaging (glass/plastic bottles, metal cans, cups) and positioning
 - Identification of defects on containers like scratches, dents, cuts and impurities on packaging
 - Seal integrity of bottle caps, inspection of PET preforms for missing threads, oval shape control

What you will see at our booth:

Some of our most innovative 360° optics will be showcased with live set ups solving common inspections in the vertical. These will include:
• _Glass bottle inspection with HC hypercentric lenses_ – featuring a special design with rays passing through bottlenecks and narrow openings, these lenses are ideal for the inspection of the inner side and bottom surfaces of hollow cylindrical objects, bottles and cans
• _Container cap inspection with PCCDL wide lateral viewing angle catadioptric lens_ – this lens is perfect for the 360° top and side view of large diameter objects like food containers, caps, preforms, bottlenecks
• _Plastic cap inspection with PCHIL large aperture hole inspection lenses_ – these optics inspect the inner side walls and bottom of cylindrical containers, holes, bottles or threaded caps from the outside.

The partner for vision system developers.

Technological benefits

In the F&B industry, strict quality controls are required to meet stringent standards in terms of integrity, safety and traceability, and maintain regulatory compliance. Since all these inspections take place on features that are located randomly both on the inner and outer surfaces of objects, machine vision and specifically 360° imaging is critical to this vertical. Ensuring a perfect balance between optical performance, throughput and cost-effectiveness, 360° view lenses accurately image the inner or outer sides of cylindrical objects with a top-down view using one single camera. They enable easy all-round inspections of objects avoiding complex and bulky multi-camera systems and part rotation while saving time for synchronization and image processing. The compactness and excellent optical performance provided by 360° view lenses make them ideal for high-speed inline inspections.

The Innovation

We offer a family of innovative 360° optics where one image is enough to inspect all the surfaces of an object. Most of our 360° lenses are patented designs with unmatched optical performance, providing customers with easy, compact and efficient solutions to vision challenges. This is a unique and advantageous approach to inspections and overcomes the limitations posed by other imaging lenses.

Links:

www.opto-e.com

Theia's TL410 motorized lens offers remote operation & NIR filter options

Booth: Hall 10, A47

Andrea Van Landingham,
avanlandingham@theiatech.com

Targeted end-user applications

Food and Beverage makers use optics for various imaging tasks, including inspection, identification of defects in product and packaging, sorting, as well as tracking and movement of goods. Theia's TL410 high resolution motorized lenses can be controlled remotely to perform all of these tasks to see defects in visible and NIR light, helping to increase inspection efficiency and product quality, read barcodes and other OCR tasks, as well as track, record and guide movement of automated systems.

What you will see at our booth:

Theia will showcase their TL410 lens demonstrating the excellent resolution performance in visible and NIR critical to defect identification (H_2O presence, etc.) applications. The demonstration will switch the filters in the iris between visible and NIR remotely to illustrate how the lens can detect defects in produce. The lens will also be used to image food packaging bar codes and demonstrate changing the FOV and/or focus distance remotely to maintain excellent focus & image quality.

Technological benefits

Theia's versatile TL410 motorized zoom and focus lens has a 4-10mm varifocal range replacing up to 4 prime lenses, allowing precise adjustment of the HFOV from 44 - 112 degrees on a 1/1.7" sensor. The flexible lens offers a working distance of 10cm to infinity to image products with variable sizes & heights or from different distances.

Made for a 1.55µ size pixel, the lens provides 300 lp/mm resolution in visible and NIR light suitable for imaging barcodes and other OCR tasks. With NIR correction from 435 – 940nm it enables excellent image quality in multi-spectral applications such as H_2O detection in produce. At F/1.4 the lens provides superior light gathering ability in challenging light conditions.

Its motorized zoom, focus, and iris enable remote operation to minimize manual intervention and costly line downtime. The Precise iris (P-iris) version uses a stepper motor to select the F/# and optimize the depth of field and image quality. Available in C, CS or D25 board mount options.

The Innovation

The motorized TL410 comes with optional integrated Near IR cut, bandpass or long pass filters in a variety of wavelengths for muti-spectral applications not available with other comparable performance motorized lenses. Currently available are models in 850 and 940nm; other wavelengths are also possible.

The lenses are compact and lightweight at only 52mm from the mounting plane (<64mm TTL) to fit into tight envelopes. While the lens weighs only 78 grams, it can withstand shock up to 50G in each of the ±Z axes as well as vibration up to 200Hz at 10G.

Theia also offers a separate motor control board accessory with software application, user interface and USB connection to easily integrate into the imaging system and control the lens. In addition to USB, i2C and UART communication protocols are also available. The modular lens & board system allow flexible configuration inside the hardware envelope.
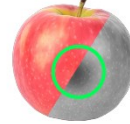
Links:

www.theiatech.com/tl410

Broadband Imaging using Quantum Dot Technology (Vis-SWIR)

Booth: Hall 10, B10

Targeted end-user applications

Emberion's end user target application is in the OPTICAL SORTING applications i.e. (Food & Plastic sorting, quality control of food) . Our innovation has been to design advanced CMOS ROIC inhouse and integrate quantum dots monolithically to manufacture image sensors. These quantum dot sensor based cameras work from 400-2000nm and using a patented measurement principle the sensors allow extremely high dynamic range (HDR>120dB) and very high speed full frame camera up to 400fps.

EMBERION

Emberion
Dr Samiul Haque,
samiul.haque@emberion.com

What you will see at our booth:

We will showcase the compact Vis-SWIR camera looking at range of LEDs from 1000nm to 1900nm which is invisible to eye but can be seen through the Emberion camera ideally 1900nm. We will also showcase a video detection at slow motion of a 1920nm water droplet which appears totally black like ink and due to the nature of the high speed camera it can slow down the droplet. Similarly wet coffee appears darker due to water absorption which can be detected by SWIR.

SWIR *Wet coffee appears darker*

Demo Story :

Wide spectral wavelength for detection of laser/LEDs of various wavelength; Slow motion water droplet to showcase using high speed camera; wet coffee appears darker due to water/moisture absorption; Multiband camera for simultaneous imaging.

Technological benefits

It allows to create better detection algorithms and separation efficiency and purity control in optical sorting, e.g. in recycling and food sorting due to wide spectral range. It is an affordable solution comparable to the incumbent technology. Using our open circuit voltage method it allows detection of bright and dark objects in a high speed conveyor belt as it can offer a very high dynamic range. In additional difficult plastics like PVC has peaks beyond 1700nm which such sensors are capable of detecting. One sen core makes better integration possibiilty for the vertical integrators.

The Innovation

1. Wide spectral range (400-2000nm) : One sensor providing VIS-NIR-SWIR & EXTENDED SWIR wavelength instead of using three sensors or minimum two. 2. One of the fastest cameras in full frame in SWIR domain (400fps full frame) 3. Quantum dot with in house ROIC design allows customisation has allowed Emberion to create a new senor design for push broom hyperspectral imaging upto 1000fps and above. This is unique as it will disrupt the HSI market by allowing more integrators to adopt Qdot based sensor technology. It is a custom chip for hyperspectral imaging. 4. Unique solution for optical sorting applications and machine vision applications using the above features.
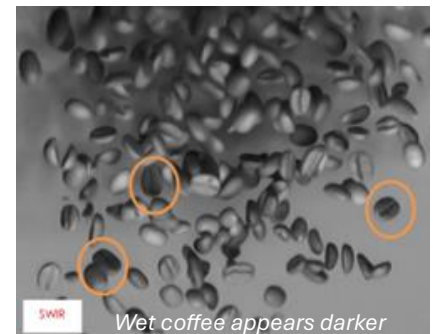
Links: *www.emberion.com*
https://www.youtube.com/watch?v=b8BUjSjEN-M&t=9s (High speed Emberion VS20 camera video)

High resolution optical sorting with minimal latency

Booth: Hall 10, B38

Targeted end-user applications

Our optical sorting technology is designed to meet the demanding requirements of industries where sorting large volumes of objects with high resolution and high speed is critical. A key application is the food industry, where products must be efficiently sorted to ensure quality and consistency. Whether sorting fresh produce, grains or processed items, our solution provides the speed, accuracy and flexibility required for optimal performance. In addition, this technology can be applied to other industries that require fast and reliable sorting solutions.

MST Vision

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www.mstvision.de

What you will see at our booth:

Experience high-speed bulk sorting with an updated version of our proven demonstration system from the last Vision show. The live demo showcases our hybrid vision approach that seamlessly integrates object detection, tracking, and rejection using FPGA technology for low latency and high speed, combined with advanced classification using GPU-based convolutional neural networks (CNN). This demonstration highlights MSTVision's ability to balance the processing load between FPGA, GPU and CPU for maximum performance and best-in-class efficiency.

MST Trigger-Board
MST Breakout-Board   MST Para32-Board
MST Matrix32-Board   MST Matrix32-Board

Technological benefits

In bulk material sorting applications, reducing the time between detection and ejection is critical for high sorting accuracy and throughput. Many systems struggle to maintain the required speed, throughput and minimal latency. Our solution provides a direct link between line scan cameras and high-speed actuators such as air nozzles, ensuring the fastest response times for maximum reliability and efficiency. The system can handle the most challenging materials and can be enhanced with multispectral imaging and photometric stereo in free-fall configurations. By offloading most of the processing to the FPGA, we achieve unprecedented latency and throughput. Our system has a latency as low as 1 ms, with valve frequencies exceeding 1 kHz, allowing processing of over 1 million objects per second using rule-based approaches. For more complex classifications, the system can be extended with GPU-based CNN algorithms.

The Innovation

"Bring Your Own AI - We offer customers the ability to integrate their own GPU-based CNN models into our high-speed sorting platform. Our software framework seamlessly integrates the customer's AI models into our system, adding only a few milliseconds to the total inference time. This flexibility allows users to facilitate their own CNNs and take advantage of the latest AI technology, while benefiting from our industry-leading sorting speed and accuracy.
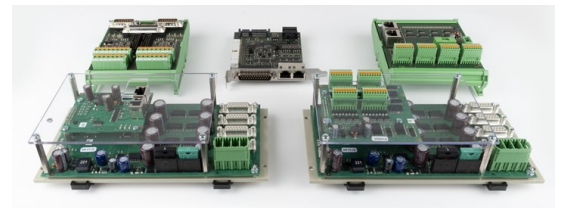
Links:

www.mstvision.de/sorting

Foreign materials detection in coffee beans using dedicated Deep Learning

Booth: Hall 10, D24

Euresys
Sandrine Deleersnijder,
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Targeted end-user applications
Detection of foreign materials in food

What you will see at our booth:
A GigE Vision camera acquires images of coffee beans, the Deep Learning Euresys EasySegment software library detects and highlights foreign materials such as stones, nuts, wood, and almond hidden in the coffee beans

EasySegment
DEEP LEARNING SEGMENTATION LIBRARY

Technological benefits
Compared to a conventional rule-based algorithm, the deep learning approach simplifies the application development reducing the time-to-market but also the maintenance of the inspection station by significantly improving the support of new definition, the deep learning technology values the expertise of the end user quality experts to build the set of representative product images used to train the deep learning segmenter tool.

The Innovation
The usage of a deep learning-based segmenter to detect foreign materials is a new way at the leading edge to solve this inspection task.

The dedicated Euresys Open eVision Deep Learning Studio assists the user during the creation of the dataset as well as and testing of the deep learning tool.

In addition, for the Euresys EasySegment library, Deep Learning Studio integrates an annotation tool and can transform prediction into ground truth annotation.

Links:
https://www.euresys.com/en/Products/Machine-Vision-Software/Open-eVision-Libraries/EasySegment

EFFILUX - Efficient LED lighting solutions for Food & Beverage.

Booth: Hall 10, D56

Effilux
Alexandre Cottereau,
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Targeted end-user applications

The Food & Beverage industry spans various areas, from processing to packaging, each with specific machine vision needs like defect inspection and gauging. One critical factor across all applications is ensuring equipment protection from food contact and harsh environments, making IP69k certification essential.

Effilux's range of powerful, stable IP69k lighting systems is specifically designed to meet these unique F&B requirements, delivering both reliability and compliance.

What you will see at our booth:

We are excited to unveil our latest barlight design: the EFFI-FLEX2-IP69K, at this year's Vision Show. After years of refinement, testing, and feedback from our EFFI-FLEX-IP69K, the second version is now ready to be deployed in any industry, offering enhanced performance for machine vision inspections.

Technological benefits

The EFFI-FLEX2-IP69K is engineered with specific mechanical design features to ensure food compliance and withstand industry solvents. Its blue light enhances damage and contamination detection, while its long, lightweight bar offers versatility across various applications. The barlight's optical dimming capability allows precise light intensity adjustments, and its high power and range of wavelengths ensure optimal performance. Additionally, it provides a cost-effective solution without compromising on quality.

The Innovation

While our product is designed to address a wide range of use cases, it also offers flexibility for adaptation to specific configurations. Drawing from extensive experience with the first version, the EFFI-FLEX2-IP69K is built to evolve and meet even the most unique demands with ease and precision.

Links:

https://www.effilux.com/en/products/led-bar

Vieworks_Food & Beverage

Booth: Hall 10, E30

Vieworks
Julie Rha, julierha@vieworks.com

Targeted end-user applications

We are targeting customers who need to inspect food, beverages, and associated packaging. Vieworks' cameras can inspect fruits for surface defects and bruises. In seed sorting, the camera can detect discolored seeds to maintain quality. It can be used to inspect the integrity of beverage packaging, such as checking for proper sealing and fill levels in bottles and cans. Additionally, the camera can sort nuts and grains by size and color.

What you will see at our booth:

We have three demos related to the food & beverage industry. There are demos featuring low resolution area scan cameras and line scan cameras, all with GigE interfaces for ease of use. The line scan camera, in particular, utilizes a RGBW quad line for true color representation. Additionally, we have a demo for a non-visible spectrum camera, which can detect defects that are difficult to see in the visible spectrum.

Technological benefits

Vieworks offers a diverse range of interface options. Not only CXP and CoF interface to cater to high speed and high resolution cameras, we also provide a lineup of user-friendly GigE and USB cameras. Our area scan cameras are available with both GigE and USB interfaces from 0.4 megapixel to 20 megapixel resolution.

Our GigE interface cameras support Power over Ethernet (PoE), ensuring ease of use. GigE cameras eliminate the need for costly frame grabbers, allowing for a cost-effective and convenient choice for your operations. VZ series has a compact housing size of 29 mm x 29 mm. This compact design allows for versatile use in various applications, ideal for the dynamic and space-constrained settings often found in the food & beverage industry.

The Innovation

In the food & beverage industry, line scan cameras are widely used for detecting defetcs. At Vieworks, we take pride in our advanced GigE interface line scan cameras, which are ideal for these applications.

Vieworks offers a comprehensive lineup of line scan resolutions: 2k, 4k, 8k, and 16k, available in both monochrome and color. Utilizing high resolution cameras such as the 8k and 16k allows to consolidate multiple cameras into one, eliminating the need of synchronization and enhancing efficiency.

Our 2k and 8k color cameras feature RGBW quad line, ensuring exceptional color reproduction and true color image acquisition. Each line can be adjusted independently for exposure and gain, facilitating defect detection under various conditions.

Vieworks provides cameras not only in the visible spectrum but also in UV, NIR, and SWIR ranges. This capability enables detection of contaminants that may not be visible in the visible spectrum alone.

Links:

vision.vieworks.com

LUCID's latest SWIR and UV cameras used for food & beverage inspection

Booth: Hall 10, E40

Targeted end-user applications
- Fruit inspection, detecting bruises and moisture
- Detecting foreign objects in food products
- Filling level of opaque plastic bags
- Detection of germs
- Differentiating different powders

LUCID Vision Labs
Renata Sprencz,
renata.sprencz@thinklucid.com

What you will see at our booth:
We will show the latest Triton2 high-resolution SWIR cameras featuring the advanced Sony SenSWIR 3.2 MP IMX993 and 5.2 MP IMX992 InGaAs sensors. These sensors enable the camera to capture images across both visible and infrared spectrums, with a pixel size of just 3.45 qm. The camera allows for superior performance in various industrial applications, such as food and agriculture inspection. In addition, we will show our Atlas10 UV camera with the high sensitivity 8.1MP Sony IMX487 UV sensor.

Technological benefits
- Making the invisible visible with LUCID's latest SWIR and UV cameras
- Easy installation, SDK provided
- No need for extra housing. IP67 protection
- Ruggedized connectors (M12, M8)
- Power over Ethernet. Single cable design
- Support through our Field Applications Engineers

The Innovation
The uniqueness of our SWIR camera is that you can use the camera from 400nm up to 1700nm. Other SWIR cameras start from 850nm and you need an additional camera if you want to see also the visible area. Not with the Atlas SWIR cameras. The Atlas SWIR is low-noise thanks to its TEC cooling and internal heatsink design. Also the IP67 housing is unique in the market.
If you need to go below 400nm, now you can use a standard camera based on 10 GigE for your applications, high resolution with high frame rates.
We recently introduced the high-resolution SWIR sensors on our compact Triton2 camera, featuring the advanced Sony SenSWIR 3.2 MP IMX993 and 5.2 MP IMX992 InGaAs sensors.

Links:
Atlas & Triton SWIR Cameras IMX992, IMX993, IMX990, IMX991 (thinklucid.com)
Atlas SWIR Camera / Sony SensSWIR Sensor Presentation (youtube.com)
SWIR Camera Coffee Bean Inspection - Tutorial: SWIR Camera, Lens, Lights (youtube.com)

SWIR Enhanced Extraneous Material Detection in Optical Food Sorting

Booth: Hall 10, E51

Targeted end-user applications

Shortwave infrared (SWIR) optical inspection is vital for detecting foreign materials in the sorting of beans, grains, nuts, and rice due to its superior capability to distinguish contaminants from food products. Operating in the 0.8 to 1.7 micron wavelength range, SWIR can penetrate organic materials or provide unique reflective spectral signatures, revealing differences in chemical composition that are invisible to traditional visible light inspection. Numerous benefits include improved quality, higher throughput and consistent yield via in-line non-destructive testing.
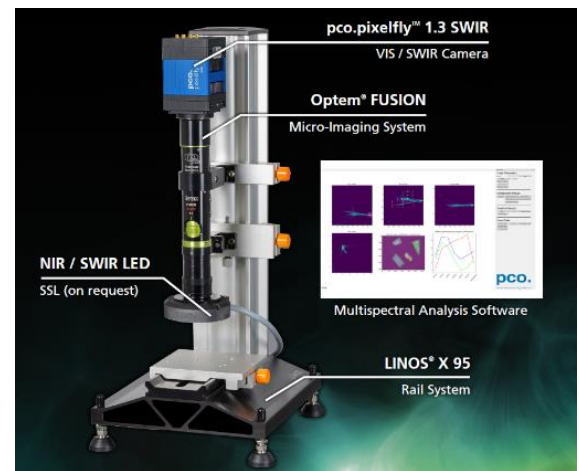
EXCELITAS
TECHNOLOGIES®

Excelitas, www.excelitas.com
Gerhard Holst, gerhard.holst@excelitas.com

What you will see at our booth:

An active demo highlighting the unique benefits of an optical food sorting solution assembled with modules from our vast product offering, including:

- pco.pixelfly 1.3 SWIR Camera
- Optem FUSION SWIR modular microscopy system
- Multispectral programmable LED
- X95 Optomechanical mounting platform
- Multispectral analysis software

Technological benefits

A modular system featuring select products from Excelitas' vast portfolio of photonic solutions.

- Camera, optics, multispectral programmable LEDs and software for rapid concept testing, development, and integration into automated application solutions
- Modular systems for versatility, flexibility and adaptability
- SWIR camera and SWIR optimized lenses provide additional information for improved decision making that is not possible with only visible wavelengths
- Expertise across key photonic disciplines to consult and maximize the success of your project

The Innovation

- Illumination, optics and, cameras designed for UV, visible and SWIR wavelengths from a single vendor
- Expert consulting and technical support for custom module development
- Multispectral identification software

Links:

https://www.excelitas.com/
https://www.excelitas.com/de/product/pcopixelfly-13-swir
https://www.excelitas.com/de/product-category/optem-fusion-microimaging-system

Detect foreign particles in your food production line with spectral imaging

Booth: Hall 10, E70.7

HAIP Solutions
Tobias Kreklow,
kreklow.tobias@haip-solutions.com

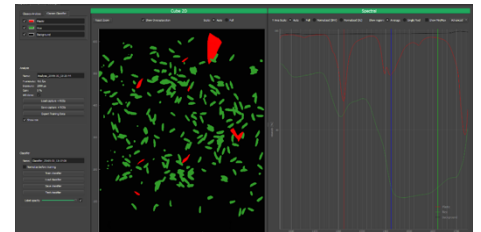## Targeted end-user applications

Any form of in-line quality control or foreign object detection within a food production line benefits from using hyperspectral technology. It is possible to see things which are not possible to be seen with common technologies already common in the food industry such as X-ray or color cameras. Detection of foreign plastic particles even small in size is now possible with the BlackIndustry SWIR 1.7 Max cameras with 1280 px spatial resolution.

What you will see at our booth:

We will show a live demo of an in-line quality control process for a food product with the highest spatial resolution hyperspectral camera on the market worldwide available. It will be an application with rather small particle size like cereals or rice grains, mixed with foreign object like plastic fragments, shell pieces or stiel remains from raisins.

Technological benefits

With hyperspectral technology it is possible to detect things which are not visible to the human eye or common vision cameras. Not only the detection of foreign object is possible but you can also imagine things like continuously monitoring water content in bread production, an input parameter for other steps in the production process. The BlackIndustry SWIR 1.7 cameras with its high spectral resolution of 6 nm allow for the detection of small changes in chemical properties, making typical labrements possible also directly on the production line.

In comparison to many other technologies, HSI can reliably identify materials based on biological and chemical content which enable the supply chain to optimize product consistency, improve shelf life, reduce waste and deliver quality.

The Innovation

The BlackIndustry SWIR 1.7 Max camera with its 1280 px spatial resolution is currently the highest spatial resolution hyperspectral camera worldwide available. We will soon introduce an even higher resolution camera of more then 2500 spatials to the SenSWIR sensor from Sony, the technology gets also more accessible as the price level is by average 20% less in series integration then common hyperspectral cameras. Especially for the food industry with its small margins in the machines, price level for those type of camers is extremely important.
All HAIP Solutions cameras also have integrated NVIDIA GPUs, making it possible to run classification algorithms on the device and just giving out the classified information reducing data amount.

Links:

https://www.haip-solutions.com/hyperspectral-cameras/blackindustry-swir-max/

TKH Vision: Cutting-edge vision solutions for Food & Beverage

Booth: Hall 10, F30

Targeted end-user applications

Machine vision systems are critical helping to ensure food safety, improve efficiency, reduce waste and maintain high quality standards. Typical target end-user applications are:

- Food sorting based on size, color, ripeness, or quality using visible and (short-wave) infrared imaging
- Packaging inspection of processed foods for integrity, label accuracy, content verification
- Fill level, cap placement, sidewalls, label application, and contamination detection in/of bottles
- Meat, poultry, fish inspection analyzing fat content, detect bone fragments, moisture

TKH Vision
Thanh Luu
thanh.luu@tkhvision.com

What you will see at our booth:

We are excited to present a series of live demonstrations, each highlighting the unique advantages of our technology portfolio in food and beverage inspection applications.

- Hyperspectral scanning system for seal inspection, material analysis (e.g., fat, moisture) and foreign body detection in food
- Liquid inspection and fill level detection with Smart SWIR camera
- Line-scan technology for sorting of nuts, dry fruits e.g.
- Robot pick & placing with a 3D object scanner for volume measurement and defect detection

Technological benefits

- SWIR technology enabling the visualization of hidden features that are invisible to the human eye or standard camera systems. This facilitates more complex quality inspection tasks including detecting foreign objects amidst similar colors or verifying transparent packaging seals
- Line scan technology for high-speed inspection tasks like sorting small items such as fruits and nuts
- Smart camera solutions with integrated image processing for bottle and packaging inspection
- Standard area scan cameras ensuring accurate color representation when sorting fruits and vegetables even under challenging lighting conditions
- 3D object scanning for sorting and portioning food items by measuring their volume, shape, size, position and detecting defects

The Innovation

TKH Vision meets the complex needs of the food & beverage inspection sector with an extensive array of complementing 2D and 3D vision components and solutions. Our unique proposition is the depth of expertise across our brands, empowering us to deliver not just products, but complete, innovative and highly flexible vision solutions in design that drive the industry forward.

Links: *www.tkhvision.com*

USB3 Cameras – Now Extended to 100 Meters with Zero Latency

Booth: Hall 10, F80

Targeted end-user applications:

The world's first industrial-grade USB 3.0 extender product, converging multiple interfaces with data transfer rates of 5Gbps over a field-terminated Category cable, with zero latency and no frame loss for distances of up to 100 meters. On top of the USB3.0, the product converges power and triggers streamlining installations, including synchronization between multiple cameras and light sources. Ideal for any factory line and warehouses requiring simple plug & play high performance machine vision.

Valens Semiconductor
Moti Shtrobach
moti.shtrobach@valens.com

What you will see at our booth:

Technology Performance & Cost Comparison:

- Side-by-side latency test of a direct USB3 Vision Camera connection and a 100m extended setup.
- The extension solution converges the power and triggers over a single category cable thus saving costs and streamlining the installation.

Multiple Camera and Light Synchronization:

- The Setup includes two extended USB3 Vision cameras mounted with LED lights, pointed at each other with an object in the middle. With a push of a button the cameras and lights are taken in and out of synchronization affecting the image.

Technological benefits

- **Distance:** 100 meters, zero latency USB3.2 Gen1 extension.
- **Convergence:** Data, Power, Triggers and UART over the extended channel for a streamlined installation.
- **Simplicity**: Out of the box, plug & play extension solution. All the benefits of a USB3 Industrial camera, now with a simple field terminated 100 extension option.
- **Preventive maintenance:** Advanced diagnostics to detect changes to cable quality.
- **Cost:** The convergence presents multiple cost saving opportunities such as removing the need for a dedicated power supply to the camera.

The Innovation

The Industrial USB3 Extender is an industry first for extending USB3.2 for distances of up to 100m over category cable with zero latency. Valens is in the process to formalize an extension category under the A3 USB3 Vision work group.

Links:

Meet Us | EMC Technology Shootout | High-Performance Extension for Machine Vision Application (paper)

System Diagram
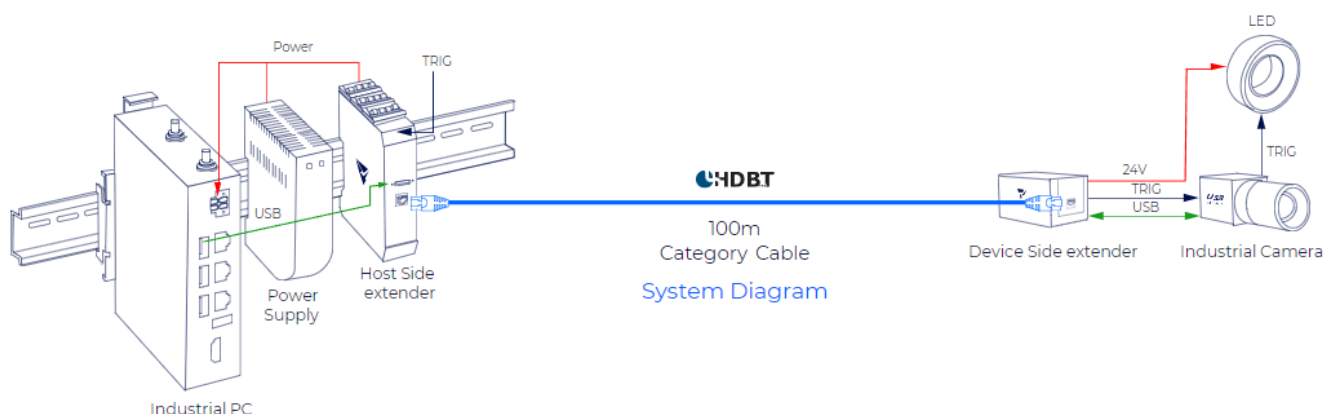
Beyond the Visible: Advanced Quality Control and Smart Sorting Solutions

EVK DI Kerschhaggl
Claudia Grill, claudia.grill@evk.biz

Targeted end-user applications

Hyperspectral imaging (HSI) enables the reliable detection of foreign bodies or defects and the quantitative analysis of properties such as pH-value, protein content, salt concentration, or moisture distribution. EVK´s smart spectral imaging solutions address today`s challenges of industrial partners in the fields of inspection, monitoring and sorting.

What you will see at our booth:

At our booth at Vision 2024, we will present our latest products and demonstrate the real-time classification of different materials with our hyperspectral imaging system, as well as an example of quantitative chemical imaging.

Technological benefits

EVK HELIOS hyperspectral cameras capture the spectral signature of materials and enable a non-invasive and non-destructive method for material classification based on the chemical composition of objects. In contrast to conventional sensors, such as color cameras, hyperspectral cameras operate across a broad spectrum of wavelengths – making the invisible visible.

Objects can be classified into quality grades and foreign bodies or contaminated food are efficiently detected and sorted out. With quantitative chemical imaging (QCI), laboratory analyses can be transferred directly to the production line. This optimizes the production process, reduces costs and ensures a consistently high product quality while minimizing waste and rejects.

EVK provides complete solutions from hardware, software and integration service. Additionally, EVK`s Sensor Fusion allows to integrate multiple sensor data into a single platform, simplifying workflows and reducing the need for multiple systems.

The Innovation

EVK combines data from various sensors to capture divers object attributes for a comprehensive classification. The combination of an EVK HELIOS hyperspectral camera with a color camera can classify foods based on their color and chemical composition. Supplemented by an EVK ABAS metal sensor, ferrous and non-ferrous contaminants, such as wires, are detected and can be sorted out. By combining different sensor technologies, materials can be sorted more efficiently and processes are optimized. In addition, quantitative chemical imaging is a key feature for quality control and process optimization. EVK systems are fully automated, easy to operate and simple to integrate into existing systems. Technical support from EVKs Professional Service Team, from the initial concept idea through to commissioning and after-sales support, completes the portfolio of EVK as a complete solution provider.

Links:

www.evk.biz
www.evk.biz/en/products-services/hyperspectral-cameras

ONESTEP AI powered by Intratel

Booth: Hall 10, H34

Targeted end-user applications

Our targeted end-user application is designed for factories and food producers seeking to automate their facilities. Our solution streamlines production processes, enhances efficiency, and ensures compliance with industry standards. By impltomation technology, food manufacturers can significantly reduce operational costs, minimize human error, and increase overall productivity, ultimately leading to higher-quality products and greater market competitiveness.

Intratel
Mariusz Proszynski,
m.zarzecka@intratel.pl

What you will see at our booth:

We will showcase a live demo of our application that can be used for the food production industry at our booth. The demo features a production line setup where our application distinguishes and categorizes objects on the line in real time. This hi the relevance of our solution by demonstrating its capability to automate quality control, increase efficiency, and ensure consistent product standards. Attendees will see how our technology can enhance their production process.

Technological benefits

It automates quality control processes, reducing human error and labour costs. Real-time object recognition increases operational efficiency and ensures consistent product standards. Our machine learning application also adapts to specific products, increasing flexibility and scalability. Our no-code platform enables the creation of highly customisable applications that can be easily scaled and integrated with existing systems. This enables the automated sending of notifications to devices, initiation of business processes and integration with various tools. By integrating our solution, food manufacturers can achieve greater productivity, improved accuracy and overall competitiveness in the marketplace.

The Innovation

Unlike traditional automation systems, our no-code application allows users to train custom models on their image data without programming skills, creating their own fully functional application that processes your data and integrates with your machines. This adaptability makes it fully capable of meeting specific production requirements. Our solution's ability to seamlessly integrate into existing workflows and be tailored to your needs further differentiates it from other automation technologies.

Links:

https://onestepai.com/

Technologies that enhance competitive edge ensure food safety and high quality

Booth: Hall 10, H50

Targeted end-user applications
Food and beverage inspections such as sorting, grading, measuring size, ripeness classification, foreign objects detection, fill level inspection, and accuracy of bottle label placement.

CMICRO

CMICRO
Michiru Niwa,
m_niwa@cmicro.co.jp

What you will see at our booth:
1. RGB Prism 4k camera with CoaxPress(CXP-12) interface (RSB400H)
 Product/company introduction video
2. 10-band SWIR multispectral solution
A live demo of multispectral inspection using dual-band SWIR camera, NDB100H, and a MultiSpec SWIR lighting system from ProPhotonix.
3. Penta-band multispectral camera
A live demo of a prototype multispectral camera capturing images in the visible and SWIR bandwidths simultaneously.

Technological benefits
1. RGB Prism 4k camera with CoaxPress(CXP-12) interface (RSB400H)
Our RGB prism camera is equipped with a dichroic prism, enabling ultra-highly precise image capture with minimum color drift.
2. 10-band SWIR multispectral solution
The combination of a dual-band SWIR camera and multispectral LED lighting system enables a cost-effective multispectral inspection system that utilizes up to 10 bands from 950nm to 1700nm.
3. Penta-band multispectral camera
This multispectral camera enables us to offer the product at low cost by compensating complex mechanisms with optical filters applied to the area sensors.

The Innovation
1. RGB Prism 4k camera with CoaxPress(CXP-12) interface (RSB400H)
 Our RGB prism camera is distinctive in the accuracy of the sensor alignments. The maximum drift of the sensor alignments can be as small as one-quarter of the pixel size.
 2. 10-band SWIR multispectral solution
The multispectral inspection system offers a high scan rate from 8kHz (10 bands) to 40Hz (2 bands). The high scan rate enables the system to be introduced to many production lines, and the deployment contributes to assuring food safety and high quality.
 3. Penta-band multispectral camera
 The camera achieves an optical system and image-capturing method to capture five bands, R, G, B, SWIR1, and SWIR2 simultaneously. It combines 5-band images captured at different timings and outputs a single composite image.

Links:
https://www.cmicro.co.jp/en.html