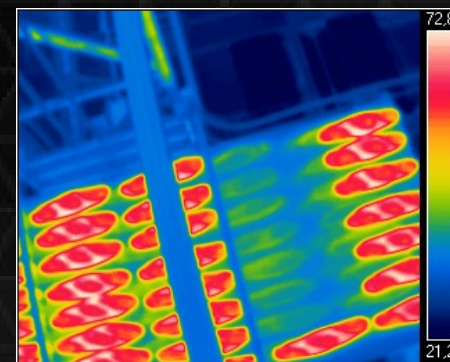
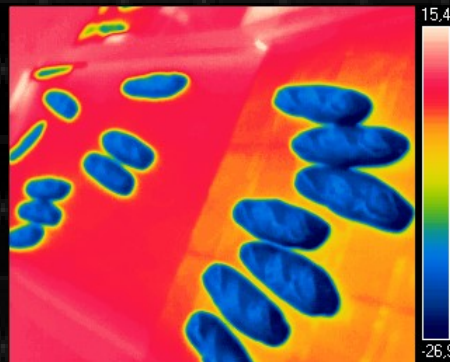




bcbMonitor 4.0 in the Food Industry



The World's Sixth Sense®

TECHNOLOGIES_{1/2}



We are **experts** in **data acquisition systems** and **machine vision**.
These technologies are the basis of our projects.

Data acquisition



- Electrical measurements
- Measurements of physical parameters
- Integration of sensors



- Integration of instruments
- Test automation
- Communications



BCB has integrated National Instruments since 1996



• • TECHNOLOGIES_{2/2}

• • Machine Vision

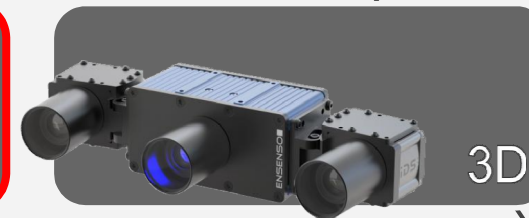


VISIBLE



IR

- Process monitoring and control
- Automatic detection of defects
- Colors and Shapes
- Dimensional control
- Noncontact temperature measurement



3D



HYPERSPECTRAL

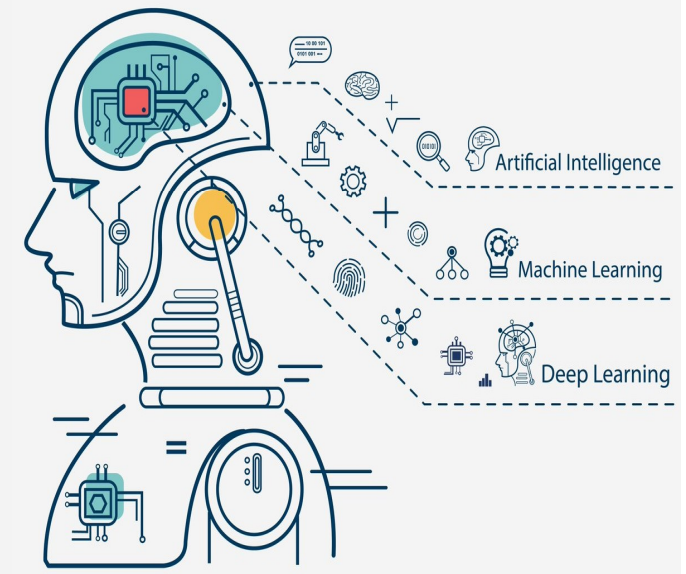


TECHNOLOGIES _{3/3}

Big Data & Artificial Intelligence (AI/ML)



- AI, Deep Learning, CNN.
- Self-learning machine vision based on thermographic images.
- Identification of complex patterns within huge volumes of data for precise prediction of defects and automatic adjustment of parameters.
- Extraction of valuable information for process and product optimization.
- Control Monitoring using DL.



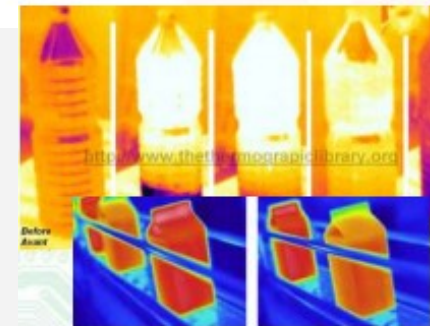
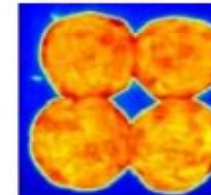
Temperature in the Food Industry



- Monitoring temperature for improving quality and safety in the production process is **key** for a food company.

Continuous and inline temperature monitoring is an **ideal tool** because it is a technique:

- ✓ Not Destructive
- ✓ Not Invasive
- ✓ Contactless
- ✓ Fast
- ✓ Efficient
- ✓ Measuring multiple objects
- ✓ High precision and repeatability.



• : Infrared Thermography in the • : Food Industry



Inspection of Animals and their meat

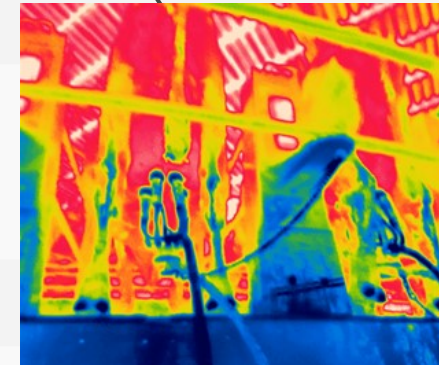
- Dairy cows: Amount of milk.
- Pre-slaughter stress: Meat quality test.
- Ham quality: Fat content.
- Storage.

Inspection of Cooked food: Bakery and baked goods

- Oven: Adjustment and verification of temperature profiles.
- Cooling.
- Control of acrylamide, PAH and AHC formation

Inspection of fresh, dairy and precooked products

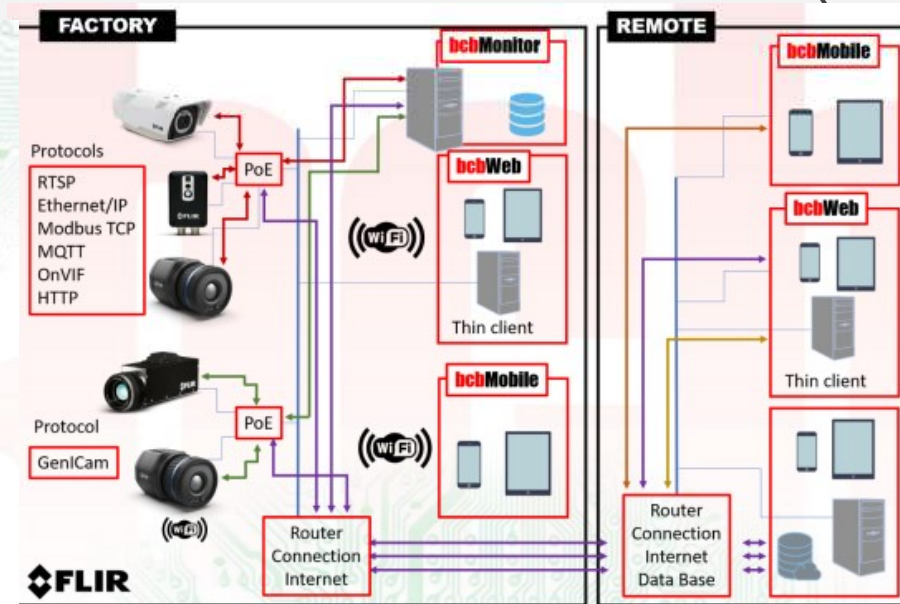
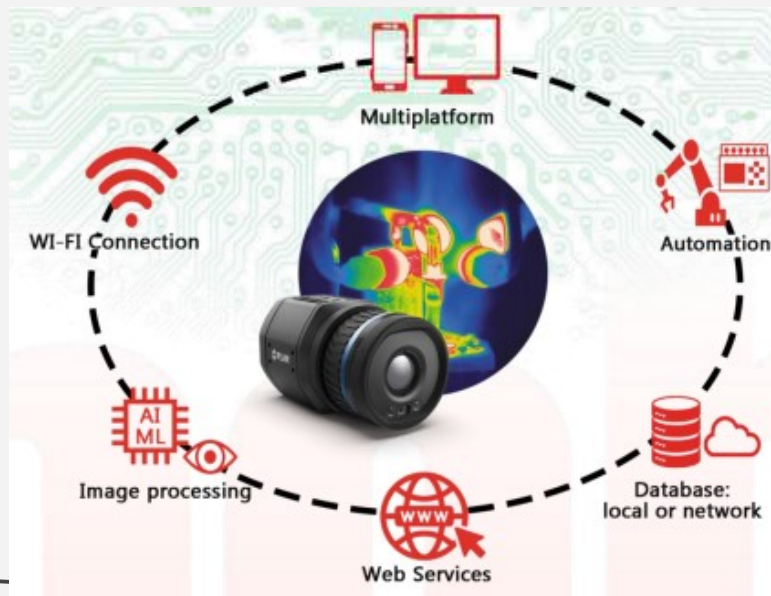
- Maturation and quality.
- Pasteurization: Temperature control.
- Drying
- Detection of foreign elements
- Heat-sealing
- Fill leaks: Induction glue bead (Tetrapak)
- Detection of pathogens.



bcbMonitor 4.0



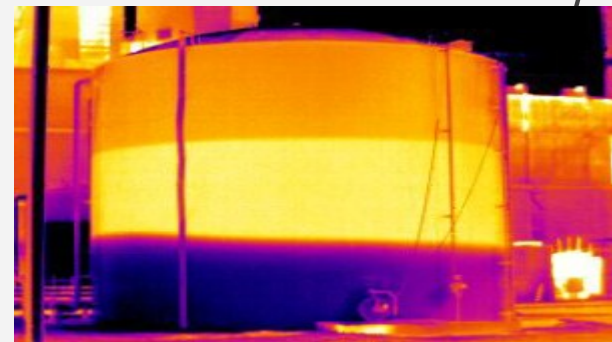
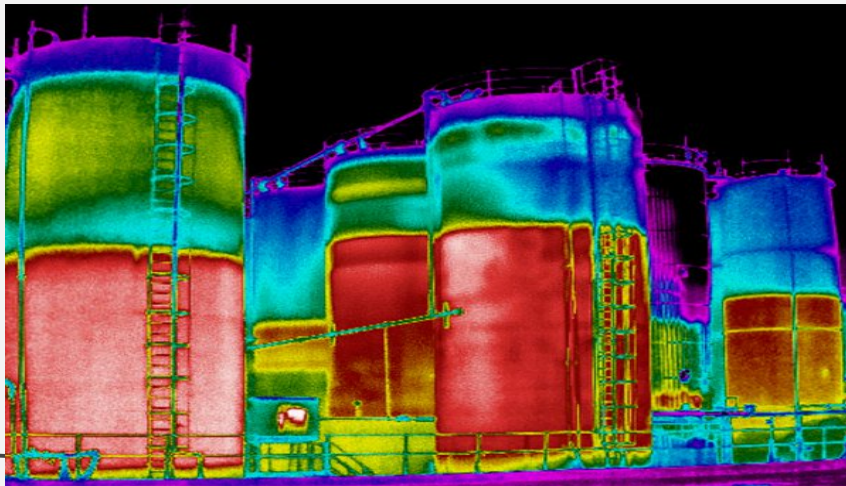
bcbMonitor 4.0® is an unattended monitoring system for production processes and critical equipment by using infrared thermography technology.



Food Industry Solutions

Monitoring of Raw Materials in Storage Silos

- Obtain continuous level, volume, weight.
- Detection of hot spots in fermented products.
- Fire prevention by controlling high temperatures of the atmosphere inside grain silos

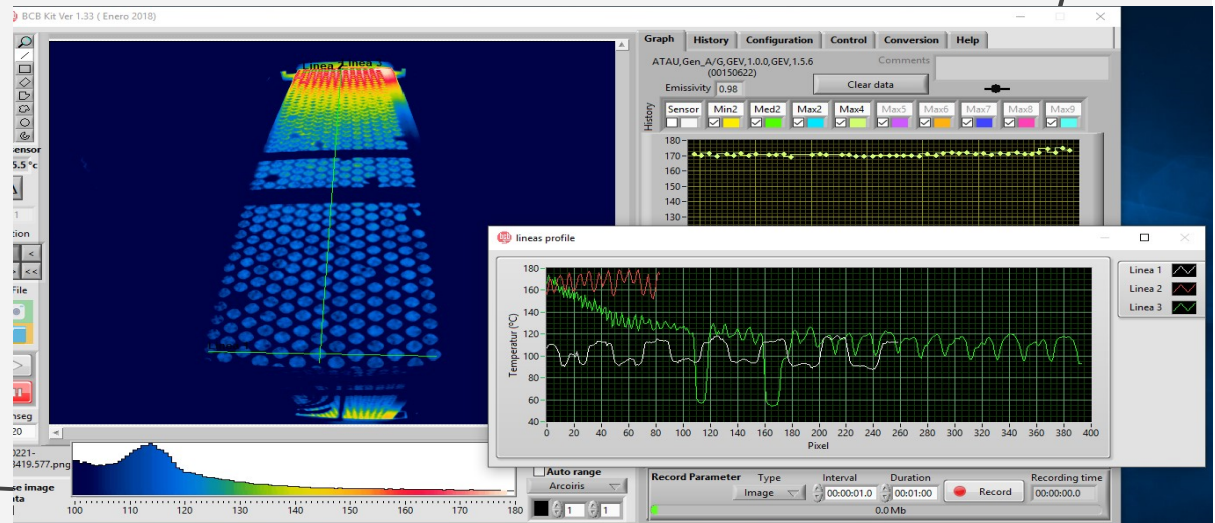
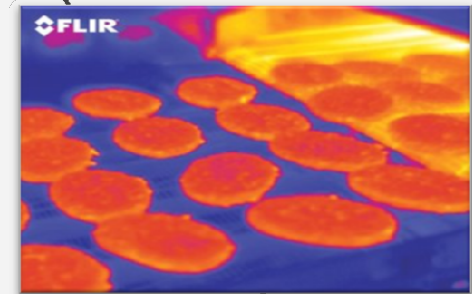


Food Industry Solutions

Cooking and Baking Inspection

Quality inspection, such as repeatability, heating uniformity and process temperature of:

- Biscuits, pastries, pastry.
- Meat and fish.
- Pre-cooked food (pizza).
- Toasted products.

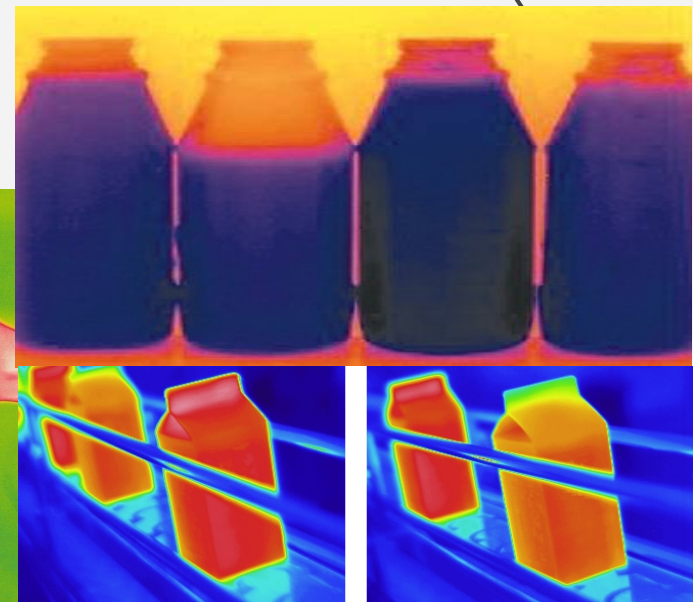
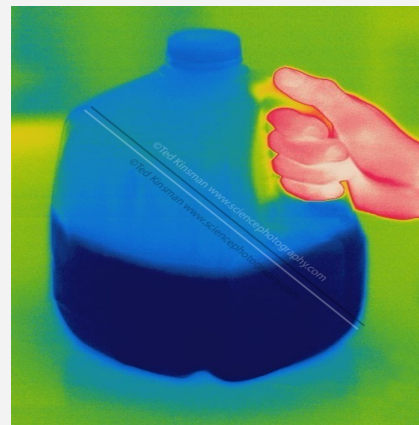


Food Industry Solutions



Filling Level

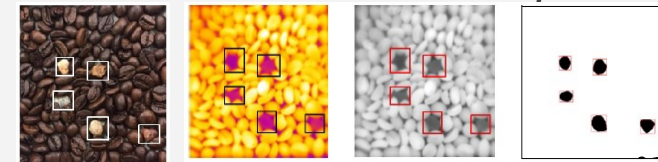
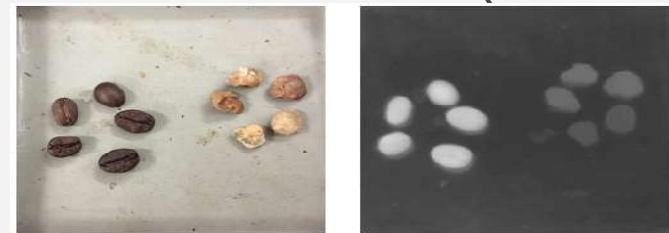
- Percentage of filling of bottles / containers.
- Product temperature inspection.



Food Industry Solutions

Detection of Foreign Bodies in dried fruits and coffee beans by active thermography

- Foreign body: piece of undesirable solid matter present in a product.
- The presence of foreign bodies in the food industry is a big concern regard to food safety.
- The biggest problem is when the foreign body cannot be distinguished by shape and color (in visible).
- The emissivity or the heat conducting capacity are used to distinguish a foreign body in the production line. Halogen lights can be used as heat sources.



Food Industry Solutions

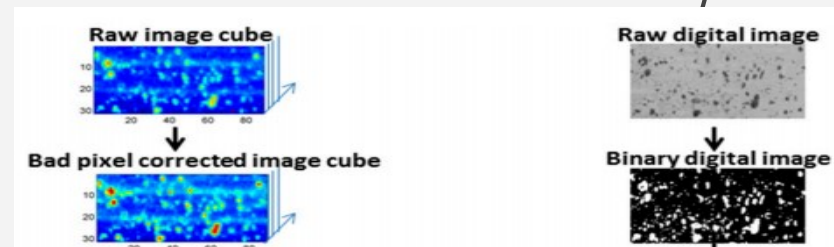
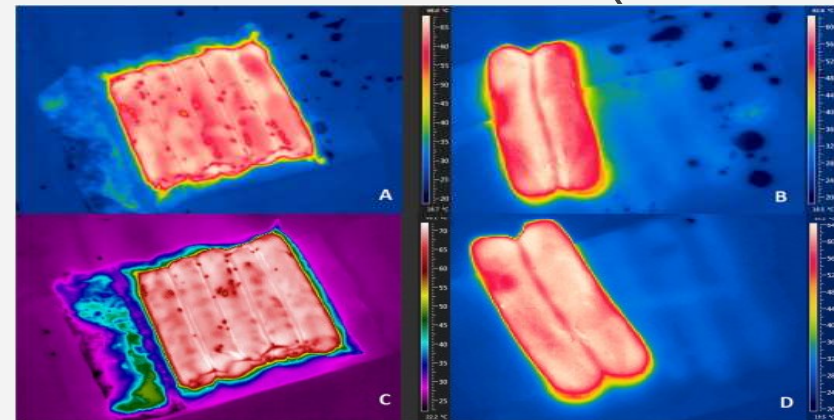
Protective Gas Atmosphere in Packaging

- Detection of gas leakage by temperature monitoring. (Thermal disequilibrium).

Ex: N₂ or CO/CO₂

- Detection of gas leakage using chemical properties. OGI (Optical Gas Inspection).

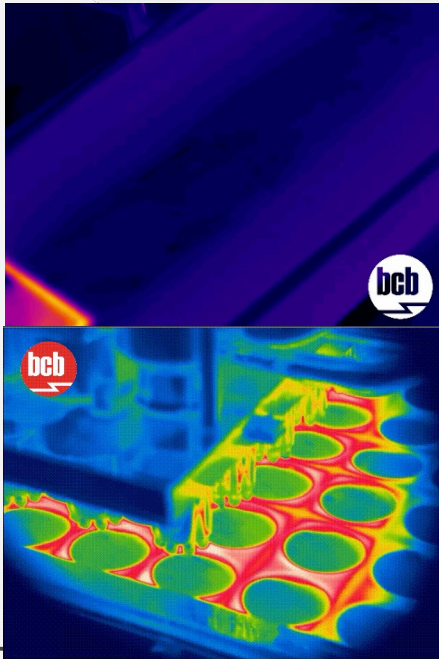
Ex: CO/CO₂



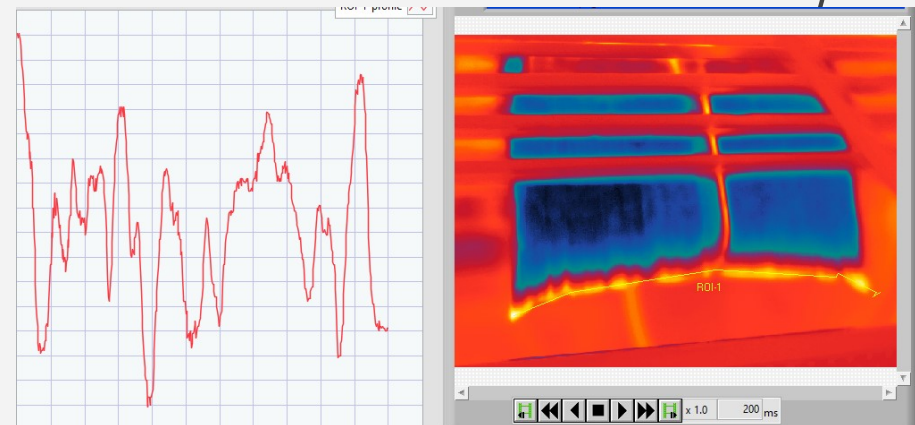
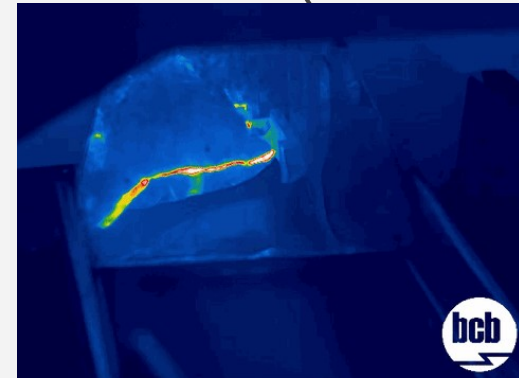
Food Industry Solutions



Sealing of Packaged Products



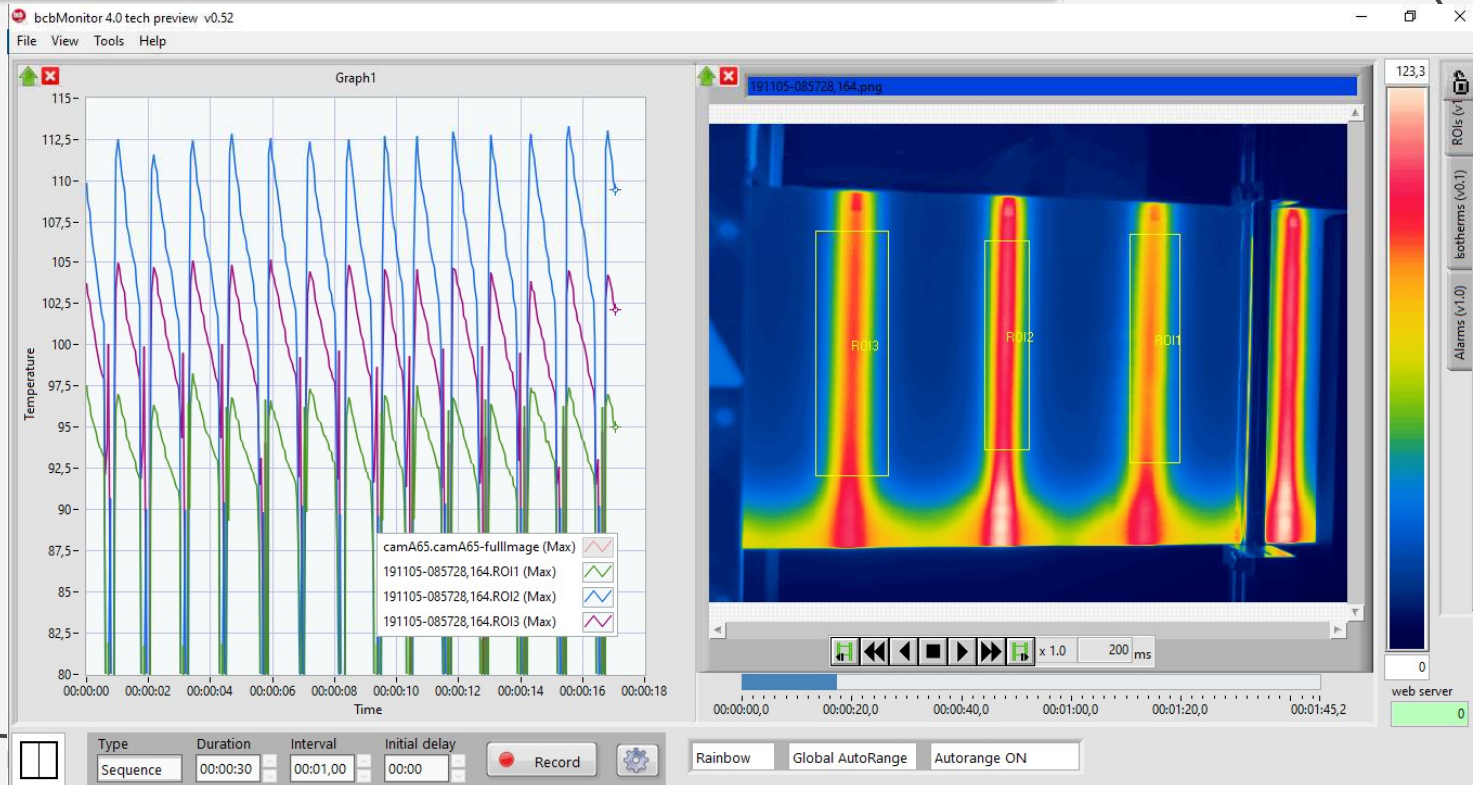
- Heat sealing in plastic package.
- Sealing using adhesives.
- Detection of contamination in thermosealing.



Food Industry Solutions



Sealing in Packaging

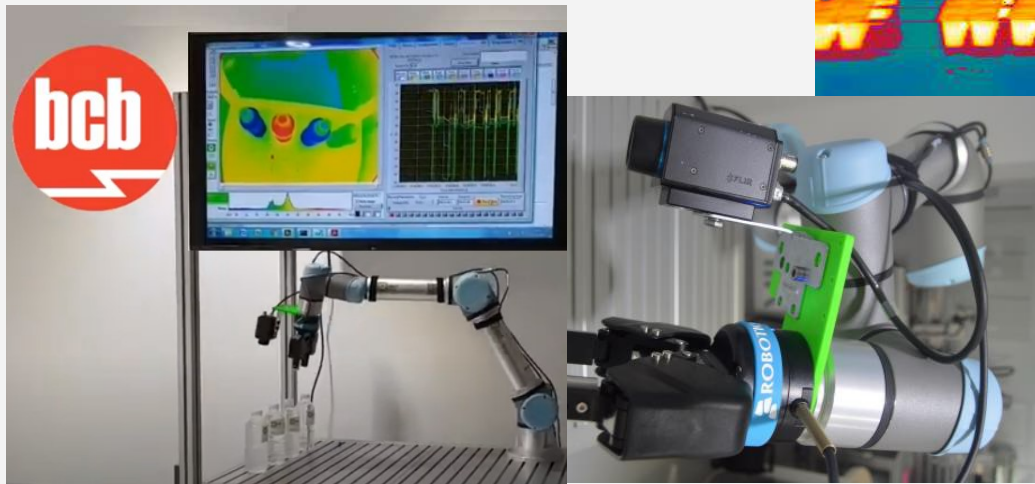
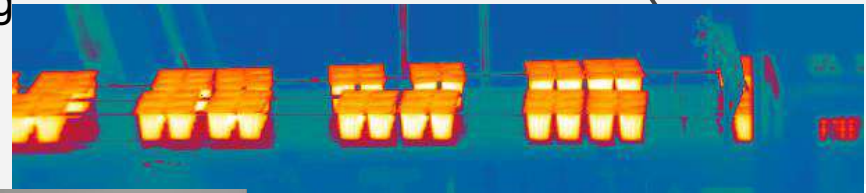


Food Industry Solutions



Thermocobots and **bcbMonitor 4.0**

- The use of collaborative robots together with **bcbMonitor 4.0** opens up interesting automation and inspection possibilities.



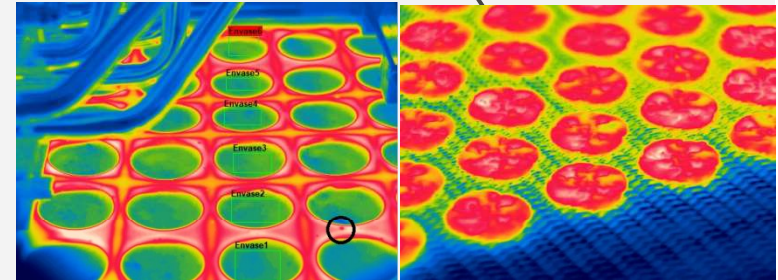
Food Industry Solutions

Repeatability and total traceability of the production process



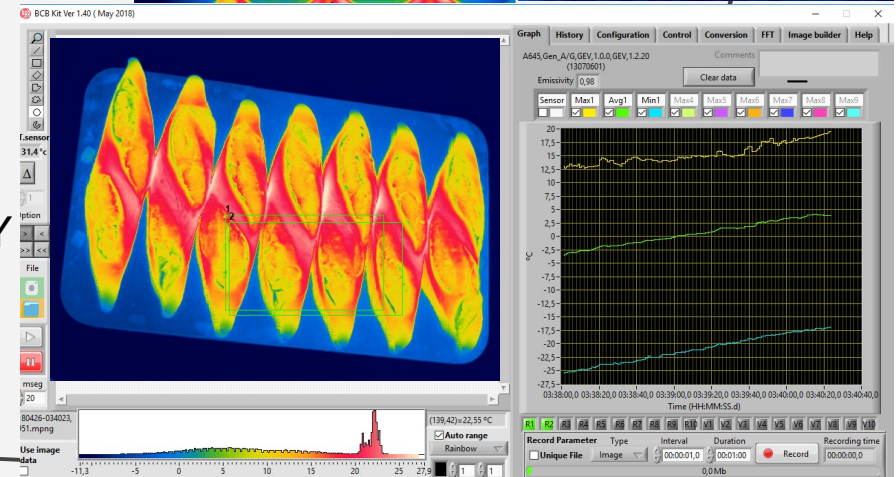
Production cost reduction:

- Decrease in waste.
- Energy saving.
- Elimination of defective products early in the production chain.



Increase in added value:

- Increased repeatability => Increased SAFETY and QUALITY of the product.





Thank you

bc**bc** Informática y Control

Fernando el Católico 11
28015 Madrid
SPAIN
Tlf: (+34) 91 758 00 50



marielgallardo@bcb.es

Avda. Miguel Alemán 200
Centro Comercial La Fe. Tr. 23
Colonia La Talavera
66473 San Nicolás de la Garza
(NL)
Tlf: (+52) 811 041 2616



jairogarcia@bcbmex.com



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