Technical Note

bcbResearch:

Thermographic solution for thermal image processing

Abstract:

This bcb technical note presents **bcbResearch®,** the software that is a powerful tool for infrared thermography inspections that enables the users to carry out the following tasks: online and offline measures analysis, camera configuration and control, thermal sequence processing for **active and passive thermography inspections**, works with a large range of **FLIR** cameras (cooled & uncooled ones wih Genicam), automated analysis and correction of thermographic images, automated and manual transfer of camera parameters, real-time visualization and filtering, 3D temperature profile display, read & store image sequences (rJPG, ATS and SEQ formats), etc.

Bcb company

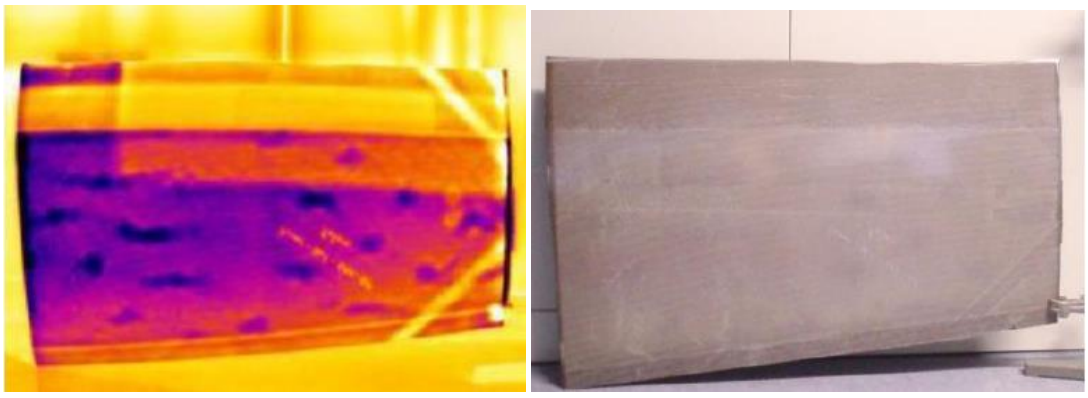
bcb is a Spanish technological engineering SME, with presence in Spain, Portugal and Mexico, specialized in thermographic monitoring systems.

We offer high added value solutions customized to each application needs, from a personalized and global perspective. We are experts in data acquisition and machine vision, with a decided vocation for innovation.

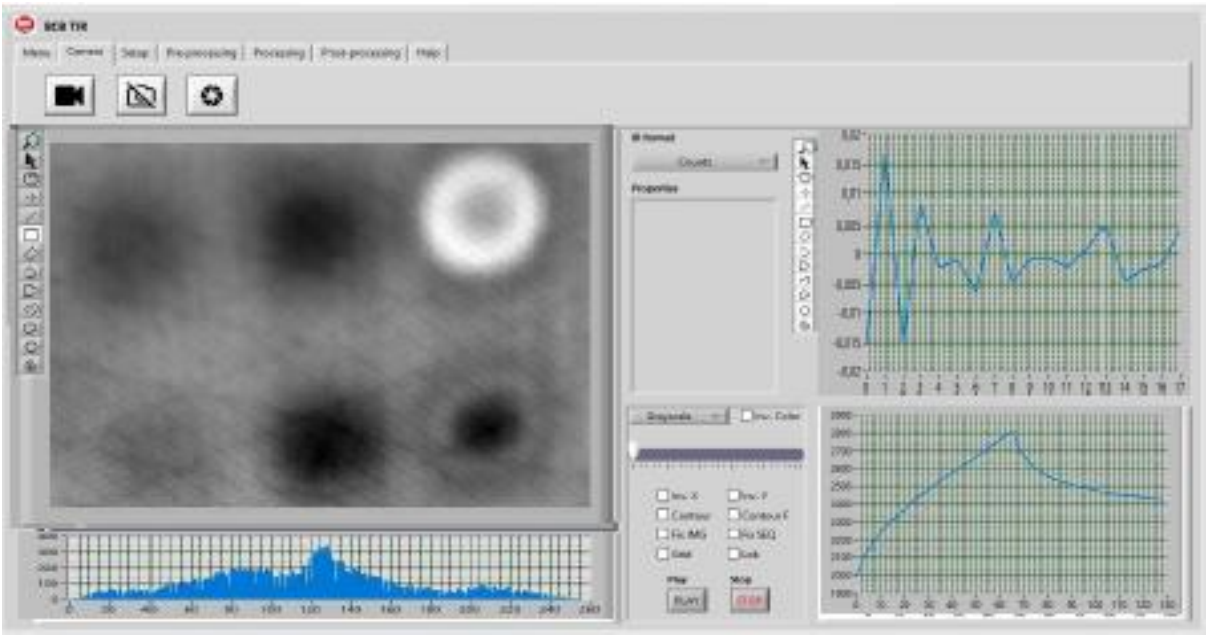
After more than 20 years of experience in the sector, we have developed a series of products including **bcbResearch®**

bcbResearch

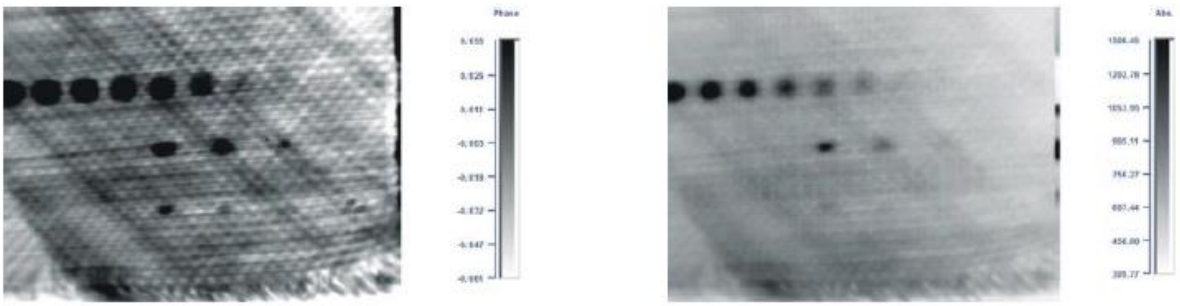
bcbResearch® integrates in a single platform, online and offline thermographic measurements and a powerful tool for thermal sequences analysis with a large number of automatic processing algorithms to identify discontinuities and defects existing in materials.



Carbon-fiber Reinforced Plastic



Infrared thermography with fixation, transient and impulse capabilities can perform advanced inspections such as non-destructive tests/essays (NDT/NDE) or stress mapping, resolving temperature differences less than 20 mK. The NDT/NDE is a method widely used to evaluate the properties of a material, component or system without causing damage. IR cameras can detect internal defects by exciting the target and observing thermal differences on its surface. Thermography is a valuable tool to detect defects and points of failure in compounds, metal or composite pieces, solar cells, bridges and electronic panels. It is also a great tool for the thermal mapping of stress when testing materials.



Conclusions:

Non-destructive testing (NDT) of materials using infrared thermography with the **bcbResearch** enables to quickly and reliably analyze them, regardless of size or shape, without permanently altering their physical, chemical or mechanical properties. Non-destructive testing using active infrared thermography provides information on material, structure, physical and mechanical properties and discontinuities and defects present on the analyzed specimen. This information is obtained from analyzing the resulting thermograms; this analysis has three phases: pre-processing, processing and post-processing.

Pre-processing methods:

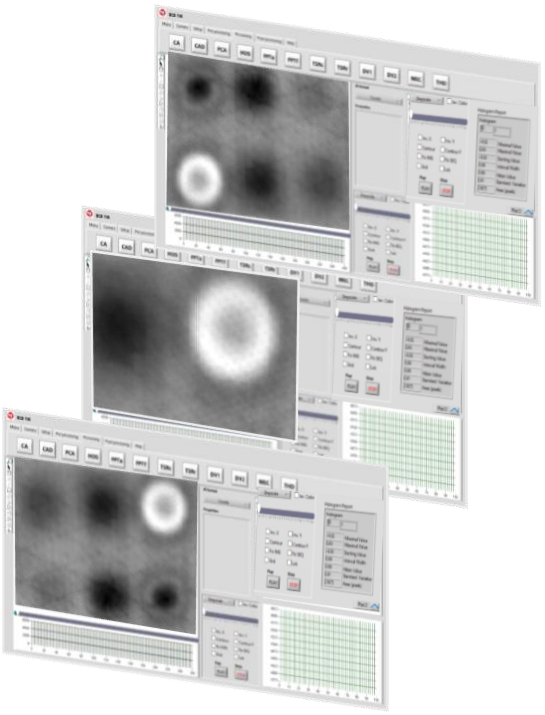
- Defective Pixels Correction
- Fixed Pattern Noise Reduction
- Normalization

Processing methods:

- Absolute Contrast (AC)
- Differential Absolute Contrast (DAC)
- Markov Error Contrast (MEC)
- Principal Component Thermography (PCT)
- High-Order Statistics (HOS)
- Pulsed Phase Thermography (PFT)
- Thermal Signal Reconstruction (TSR)
- Total Harmonic Distortion (THD)

Post-Processing methods

- Histogram equalization
- Image Filters
- Histogram Manipulation



Non-destructive testing (NDT) with fixation, transient and impulse capabilities. FLIR cameras are valuable tools for detecting points of failure in compounds, solar cells, bridges and electronic panels, as well as thermal stress mapping when testing materials.

Spectral Analysis. Thermal cameras with fast integration time are essential for hyperspectral imaging systems.

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