

OUR STRENGTHS

- ▷ Construction analysis
- ▷ Failure analysis
- ▷ Reverse engineering

COMMUNICATIONS & SECURITY

3D X-RAY TOMOGRAPHY

Non-destructive testing & 3D object reconstruction





COMMUNICATIONS & SECURITY

3D X-RAY TOMOGRAPHY

Non-destructive testing & 3D object reconstruction

Thanks to its Component Engineering Laboratory (CEL), THALES offers a wide range of services in terms of electronic component expertise, ranging from the electrical characterization to the failure analysis through the construction and contamination analysis and the environmental tests.

The CEL, jointly with the French Space National Research Center (CNES), has developed know-how skills in the spatial field for 15 years. Both teams share a common platform regrouping facilities in a laboratory of more than 700 m².

A turning-point regarding analysis strategies for electronic components, printed circuit boards (PCB) and systems integrating (or not) electronic technology was reached by purchasing an X-ray tomography device used to perform the 3D object reconstruction.

The obvious advantage of this technique lies in its non-invasive property used to analyze an object and to reveal the internal object problems, while preserving its integrity.

Construction analysis

The 3D X-ray tomography is used to assess the quality of an object construction process. This analysis is valid for elementary components to complex systems and does not affect their physical integrity.

3D inner assembly display: position of various elements, type of technology used, etc.

Assembly quality assessment with virtual micro-section (μ -section) in any axis: PCB construction, System in Package (SIP) construction, solder joints, die-attach, wiring, etc.

Failure analysis

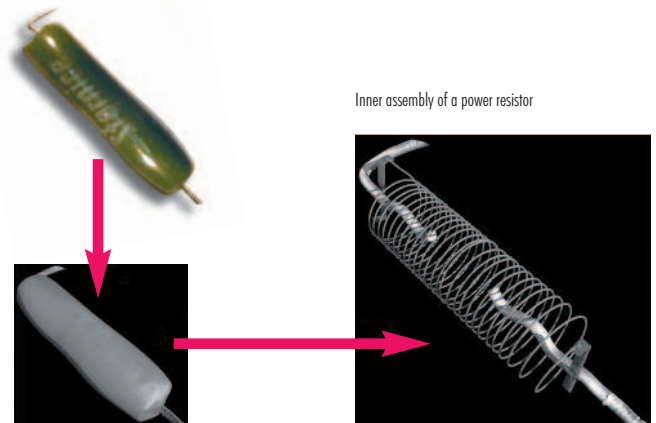
As the spatial technology resolution can exceed micrometers, 3D X-ray tomography has become an essential tool for the failure analysis.

Integrated to a failure analysis flow, 3D X-ray tomography is used to locate precisely some types of defects and to increase the success rate for this type of analysis. It is valid for 3D assemblies as well as for classic electronic components.

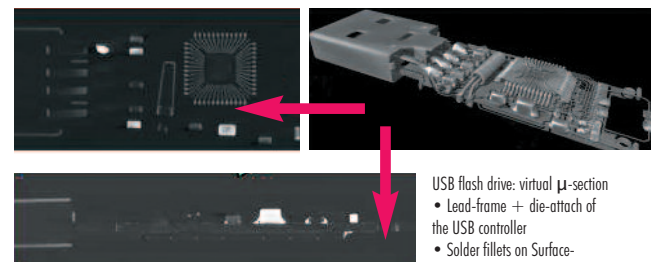
Now the material evolution can also be displayed or the presence of failures can also be detected on an object subjected to aging tests for example, while it is still possible to subject it to other tests.

Reverse engineering

3D X-ray tomography is the best solution to reverse complex systems in package, in order to reconstruct an electrical diagram based on the routing of a printed circuit board, of a component, etc. This technology can also be used to perform penetration tests or robustness tests for safety systems.



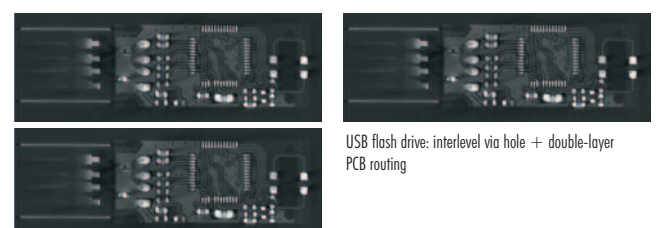
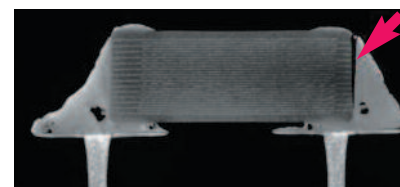
Inner assembly of a power resistor



USB flash drive: virtual μ -section
 • Lead-frame + die-attach of the USB controller
 • Solder fillets on Surface-Mounted Components (SMC)



Ceramic resistance defects:
 • crack on substrate
 • delamination on terminations



USB flash drive: interlevel via hole + double-layer PCB routing