

Thermal Barrier Coating Inspection

Terahertz Technology for Non-Contact TBC Thickness Measurement, TGO Monitoring and Hidden Defect Detection



HIGHER
 RELIABILITY



LONGER
 COMPONENT LIFE



SAFER FLIGHT
 OPERATIONS

Why TBC Inspection Matters



Topcoat thickness
 variation



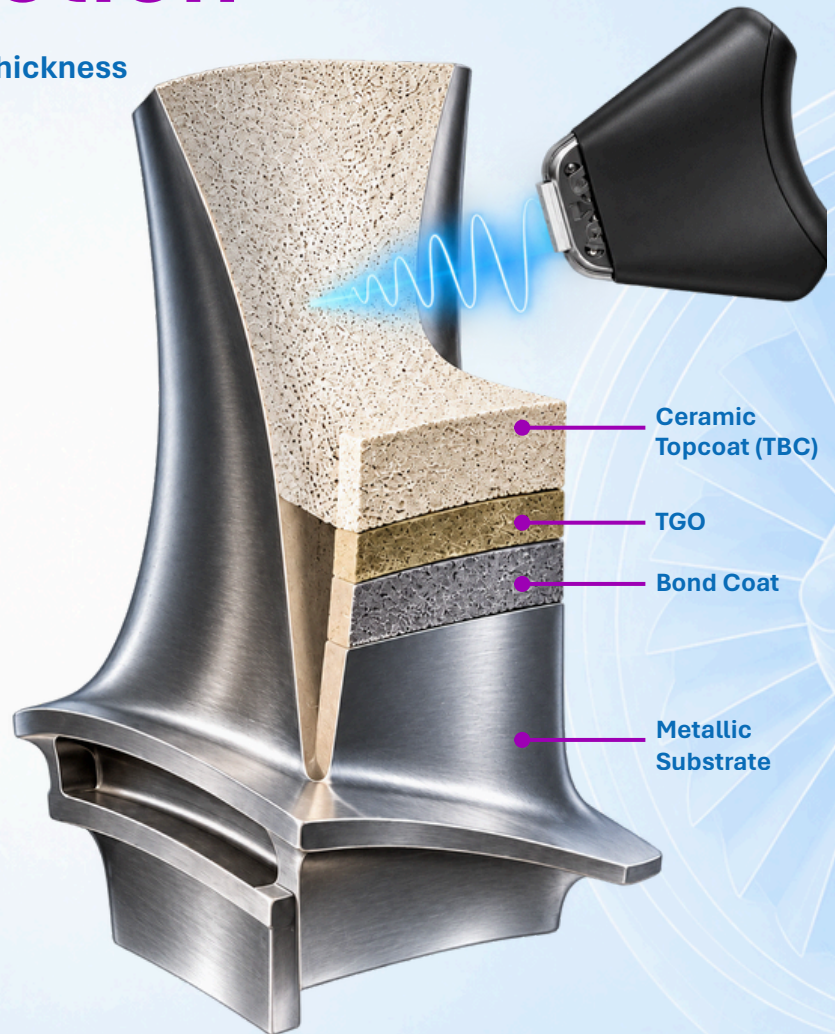
TGO growth & ageing



Delamination / voids /
 air-filled cracks



Porosity & microstructure
 changes

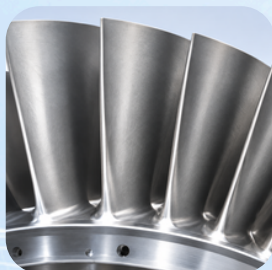


Applications

For Aerospace Gas-Turbine Components



Turbine Blades



Vaness



Combustor Liners



Shrouds



Transition Ducts



Non-Contact



Non-Destructive & Non-Ionising



No Couplant

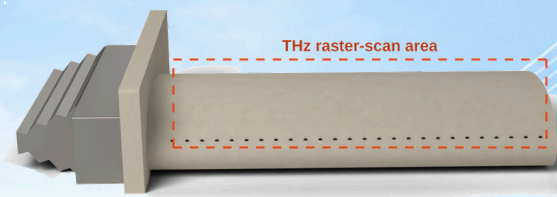


Automation Ready



How Terahertz Technology Works for TBC Inspection

THz pulses penetrate the ceramic topcoat and reflect from material interfaces. Changes in the reflected waveform provide information about coating thickness, interface condition, and hidden defects.



1 SCAN

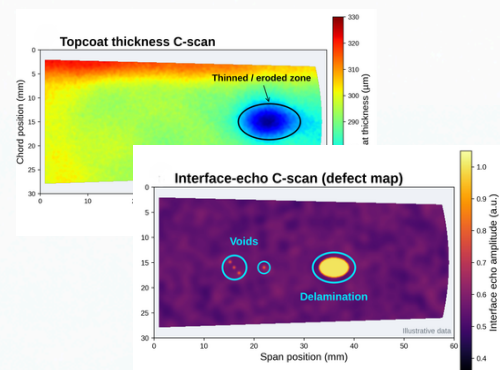
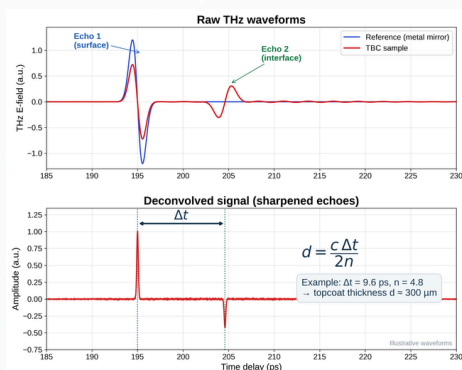
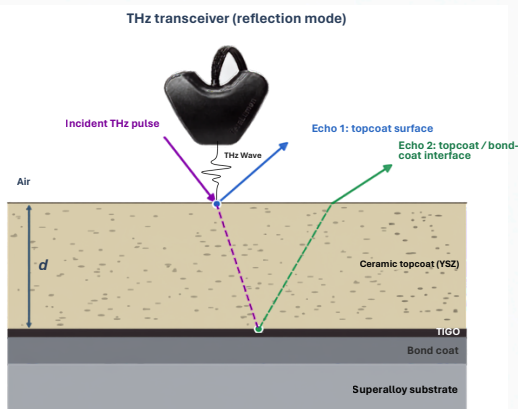
Single-side, non-contact TGH reflection scan with controlled stand-off.

2 DETECT

Identify reflections from topcoat, TGO, and bond-coat interfaces. Detect delamination, voids, porosity changes, and coating loss.

3 ANALYSIS & REPORT

Determine topcoat thickness, TGO and ageing indicators, and defect location. Generate 2D B-scan / C-scan maps and provide clear inspection results.



Typical TBC System (Cross-section)



- Air
- Ceramic Topcoat (YSZ or advanced ceramic)
- Thermally Grown Oxide (TGO)
- Bond Coat (MCrAlY)
- Metallic Substrate (Ni-based superalloy)

Key Inspection Capabilities



Thickness Mapping

Topcoat thickness maps across complex geometries.



Interface & Delamination

Air gaps, delamination and coating-bond coat interface indications.



Porosity & Structure

Porosity and microstructure assessment.



Erosion & Ageing

Coating loss, TGO growth and ageing indications.

Non-contact inspection for validated TBC systems across turbine blades, vanes, combustor liners, shrouds and transition ducts.

**Inspect Deeper.
Measure Smarter.**



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