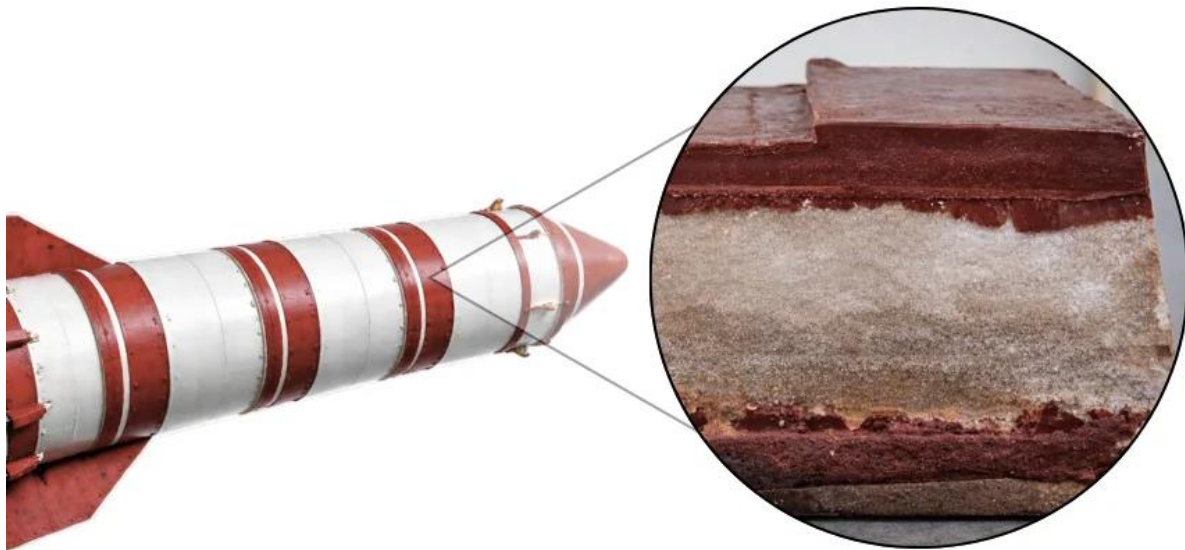


Red Rubber Inspection

Terahertz NDT for Non-Contact Red Rubber Thickness, Bond Integrity and Internal Defect Inspection

Red rubber is used in aerospace thermal-protection structures where **thickness, bond quality and internal integrity** are critical. During manufacturing and service, hidden defects such as **voids, inclusions, delamination, debonding and thickness variation** can develop within the material.

TeraNIM-Aero helps inspect red rubber non-destructively and without physical contact, enabling aerospace teams to evaluate **material thickness, bond interfaces and subsurface defects** without cutting the component or using liquid couplant.



Why Red Rubber Needs Non-Contact Inspection?

- Material thickness can vary across manufactured components
- Voids and air gaps can develop inside the rubber structure
- Foreign inclusions may become embedded during manufacturing
- Bonded interfaces can develop delamination or debonding
- Single-sided non-contact inspection supports repeatable quality control

Conventional Red Rubber Inspection Challenges

Visual Inspection: Surface-Based Inspection

Ultrasonic Testing: Contact-Based Inspection

Red Rubber: Inspection Challenge

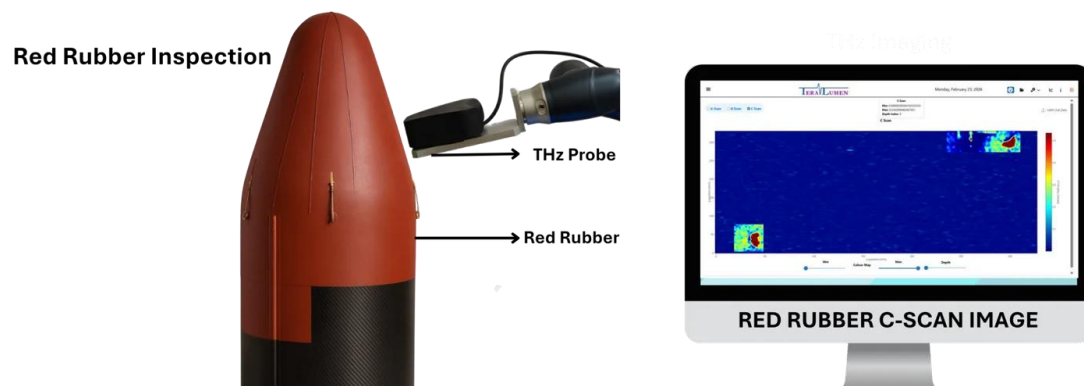
- ⚠ Hidden internal voids
- ⚠ Thickness variation
- ⚠ Foreign inclusions
- ⚠ Delamination / debonding
- ⚠ Need for non-contact inspection

How Terahertz Technology Works for Red Rubber Inspection

TeraNIM-Aero directs a THz pulse into the red rubber structure and analyses reflections generated from the material surfaces, internal interfaces and discontinuities.

A simplified inspection path is:

Air → Red Rubber Surface → Red Rubber Layer → Bond / Adhesive Interface → Substrate



TeraNIM Red Rubber Inspection Workflow

SCAN: Direct a THz pulse onto the **red rubber surface** and acquire the reflected signal using **single-side, non-contact access**.

DETECT: Capture reflections from the **rubber layer, bond interface and internal discontinuities** such as voids, delamination or debonding.

ANALYSE & REPORT: Extract the reflected-signal features to determine **thickness, interface condition and defect indications**, then generate the inspection result.

Key Advantages for Aerospace OEMs & Research Organisations

Non-Contact Inspection: No physical probe contact with the red rubber surface.

Non-Destructive Testing: Inspect the material without cutting or sectioning the component.

Thickness Measurement: THz time-delay information can be used to determine calibrated red rubber thickness.

Internal Defect Detection: Voids, inclusions and other internal discontinuities can alter the reflected THz signal.

Bond & Defect Mapping: Scanning multiple locations enables visualization of thickness variation and interface anomalies.

Automation Ready: TeraNIM-Aero can be integrated with scanners and automated positioning systems for repeatable inspection.

Red Rubber Quality Control with TeraNIM™

TeraNIM-Aero provides a non-contact and non-destructive approach for inspecting suitable aerospace red rubber structures.

By combining **THz reflection measurement, calibrated thickness analysis, interface evaluation and automated scanning**, the system can support **red rubber thickness measurement, void and inclusion detection, delamination and debonding assessment, defect mapping and digital aerospace quality control**.