



SEEING THE INVISIBLE

High-resolution internal structure has gained its importance in aerospace, oil & gas, additive manufacturing, precision engineering and biomedical diagnostics applications. Challenges for internal structure measurement techniques include penetration depth and optical resolution. Yet, at the same time, large objects and in-situ measurements require imaging instruments to meet new processing speed demands.

PMG focuses on cutting-edge 3-dimensional optical measurement technologies using Mid-infrared (IR) optics and X-ray optics.

The group carries out collaborative research with academic institutions, co-develops equipment and devices with companies, and provides technical services and training to the manufacturing industry.

Core Competencies

Optics

- X-ray coherent source
- High power Mid-IR lasers
- Near-field optics for nanoscale measurements
- Coherent optics for surface and sub-surface measurements
- Non-linear optics for high power lasers and imaging
- Optics modelling and design

Image Processing

- X-ray Computerised Tomography
- X-ray image processing
- 2D/3D vision inspection

Target Industries



Aerospace



Automotive



Construction



Electronics



Marine



Medtech



Oil & Gas



Precision Engineering

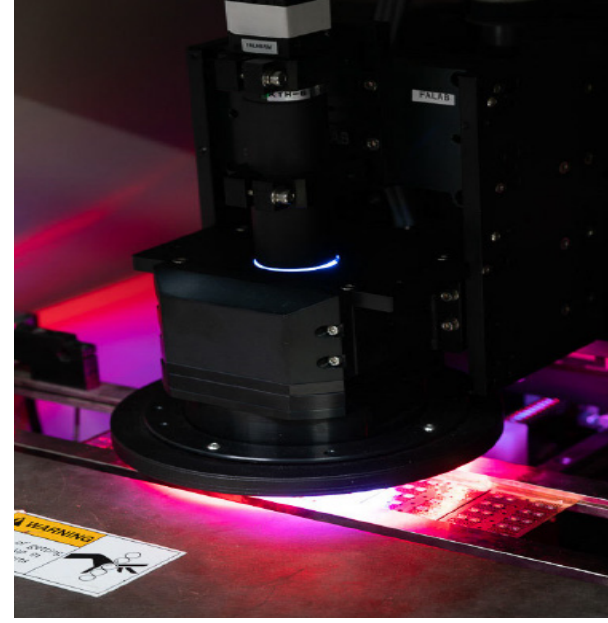


Semiconductor

SUCCESS STORY

World-First 3D Inspection System for Semiconductors

Component Technology, a local Small and Medium Enterprise distributor of bonders, and SIMTech jointly developed a first-of-its-kind 3D wire bond inspection system, which was far superior compared with the traditional 2D system for semiconductors. The product's success has also led Component Technology to expand its staff strength from about 20 in 2006 to 130 today. Since the positive reception to the wire bond inspection system, Component Technology has continued to collaborate with SIMTech for another 15 industrial projects. Component Technology is now looking to move beyond the semiconductor industry and is working with SIMTech to develop inspection solutions for other sectors.



“With SIMTech’s help, we have transformed from being a trading company to an original equipment manufacturer,”

Mr Berne Chung, Founder and Managing Director, Component Technology

Technologies Available for Transfer

3D Optical Measurements

- Scanning white-light interferometry for profile measurements
- 3D wire-bond inspection system
- Moiré fringe technique for 3D measurements
- Wavefront sensing for inspection aspherical lens measurement

Nano-metric Measurements

- Scanning Near-field Optical Microscopy (SNOM)
- Scanning Near-field Photon Emission Microscopy (SNPEM)

X-ray Inspection

- X-ray Computerised Tomography (CT) and visualisation
- X-ray Computerised Tomography (CT) for multi-layered object
- X-ray sterilisation for food packaging and medical device
- X-ray phase contrast imaging

Vision Inspection

- Glass inclusion inspection
- Wafer surface inspection
- Lens surface defect inspection
- Solar cell defects inspection
- Stem cell culture monitoring system
- Tissue imaging
- Wire bond inspection

Non-Destructive Testing (NDT)

- Active thermography for inspection defects in composites
- Mid-infrared/near-infrared laser calorimetry

Research Partners

- Carnegie Mellon University (USA)
- Harvard University (USA)
- Institute of High Performance Computing (Singapore)
- JILA, Joint institute of CU Boulder and NIST (USA)
- Massachusetts Institute of Technology (USA)
- Nanyang Technological University (Singapore)
- National University of Singapore (Singapore)
- Singapore University of Technology and Design (Singapore)

