

SpeedSpec: Semiconductor Metrology System

ASTRI's SpeedSpec's revolutionary line-scanning 3D imaging system combines ultra-high resolution with lightning-fast scanning speeds to detect even the smallest defects in advanced chip packaging. As semiconductor manufacturing pushes physical boundaries, this innovation addresses the industry's most critical quality control challenges. The technology enables manufacturers to inspect complex 3D structures with unprecedented accuracy, ensuring superior chip performance and reliability.

Industry Challenges

- Traditional inspection methods cannot adequately handle complex 3D chip structures
- The semiconductor industry urgently requires faster, more precise inspection technologies to detect defects whilst maintaining quality standards and manufacturing efficiency

Major Benefits

- **Ultra-deep structure inspection:** Advanced coaxial telecentric optics measure extremely deep features with aspect ratios exceeding 8:1 to 18:1
- **Lightning-fast scanning:** Hardware-accelerated processing achieves scanning speeds over 10,000 lines per second, dramatically increasing inspection efficiency
- **Multi-layer transparency analysis:** Proprietary algorithms penetrate through transparent materials, clearly capturing 3D data from every layer simultaneously

Application Areas

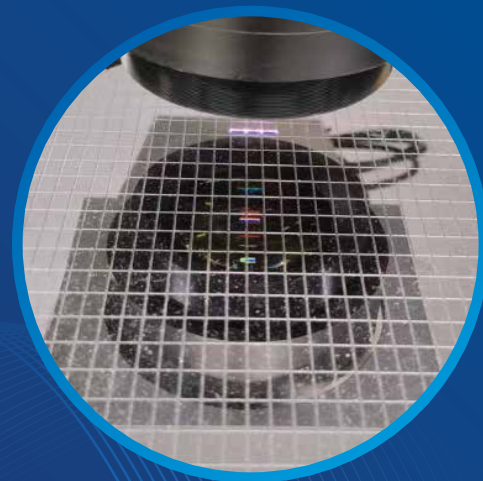
- **Semiconductor Wafer Inspection:** Bump, TSV (Through-Silicon Via), and RDL (Redistribution Layer) quality verification
- **Advanced Packaging:** Comprehensive 3D inspection of complex chip packaging structures
- **Display Technology:** Mini-LED and Micro-LED manufacturing quality control
- **Specialty Applications:** Glass wafer inspection, PCB deep-hole measurement, and LWIR metalens characterisation for cutting-edge optical components

Collaborator(s)

Manufacturers of semiconductor and precision manufacturing

Award(s)

International Exhibition of Inventions Geneva,
Hong Kong Awards for Industries



It utilises breakthrough line-scan confocal technology for semiconductor inspection, enabling precise detection of microscopic defects in complex chip packaging

