



## Automated Wafer Metrology Tool

### Challenge

A semiconductor manufacturer needed an automated metrology tool to detect and measure laser-cut trenches on silicon wafers with accuracies down to 1 micron.

### Solution

The metrology tool combines a profilometer with a high-performance, high-resolution vision system and laser interferometers to detect and measure laser-cut features on silicon wafers. The operator loads wafer cassettes into the machine at two cassette stations and selects an inspection recipe for each cassette. Sensors detect and inspect each cassette for extended wafers that could be damaged during robot moves.

An ISEL robot with edge grip effector transfers a single wafer to the notch finder for orientation and OCR identification. Once identified, the robot transfers the wafer to the X-Y table, where clamps extend and grip the wafer. A unique self-calibration tool and software algorithm performs several calibration functions, identifying small angular errors in the cameras to compensate for induced errors caused by bowed wafers. Once calibrated, vision cameras identify the wafer's fiducials and software computes wafer-to-table orientation before the wafer moves to the trench inspection sequence. Here, the Micro-Epsilon profilometer inspects three-dimensional features of the wafer, providing final resolutions of less than 0.1 micron. The robot transfers the inspected wafer back to its original slot in the appropriate cassette and continues processing additional wafers in each cassette.



### Result

This sophisticated, flexible wafer metrology system detects and measures wafers with **less than 1-micron accuracy** and accounting for measurement errors due to bowed wafers.

### About DWFritz Automation

Established in 1973, DWFritz Automation provides world-class build-to-print manufacturing capabilities to clients, in addition to designing, building, and supporting engineered-to-order automation systems and high-speed, non-contact metrology products.

