# 1 INTRODUCTION

The Tencor Instruments Surfscan 6200 is a wafer surface analysis system that locates, counts, and sizes defects down to 0.1 μm.

The Surfscan 6200 includes a curve-fitting calibration system for backward compatibility with the Tencor Instruments Surfscan 4500 and Surfscan 5500. Customers can produce custom calibration curves to measure wafer surfaces with comparable sensitivity to other surface analysis instruments such as the Surfscan 4500 or 5500.

Surfscan 6200s are calibrated using a standard Tencor calibration curve. The same wafer scanned on different Surfscan 6200 instruments will yield almost identical results.

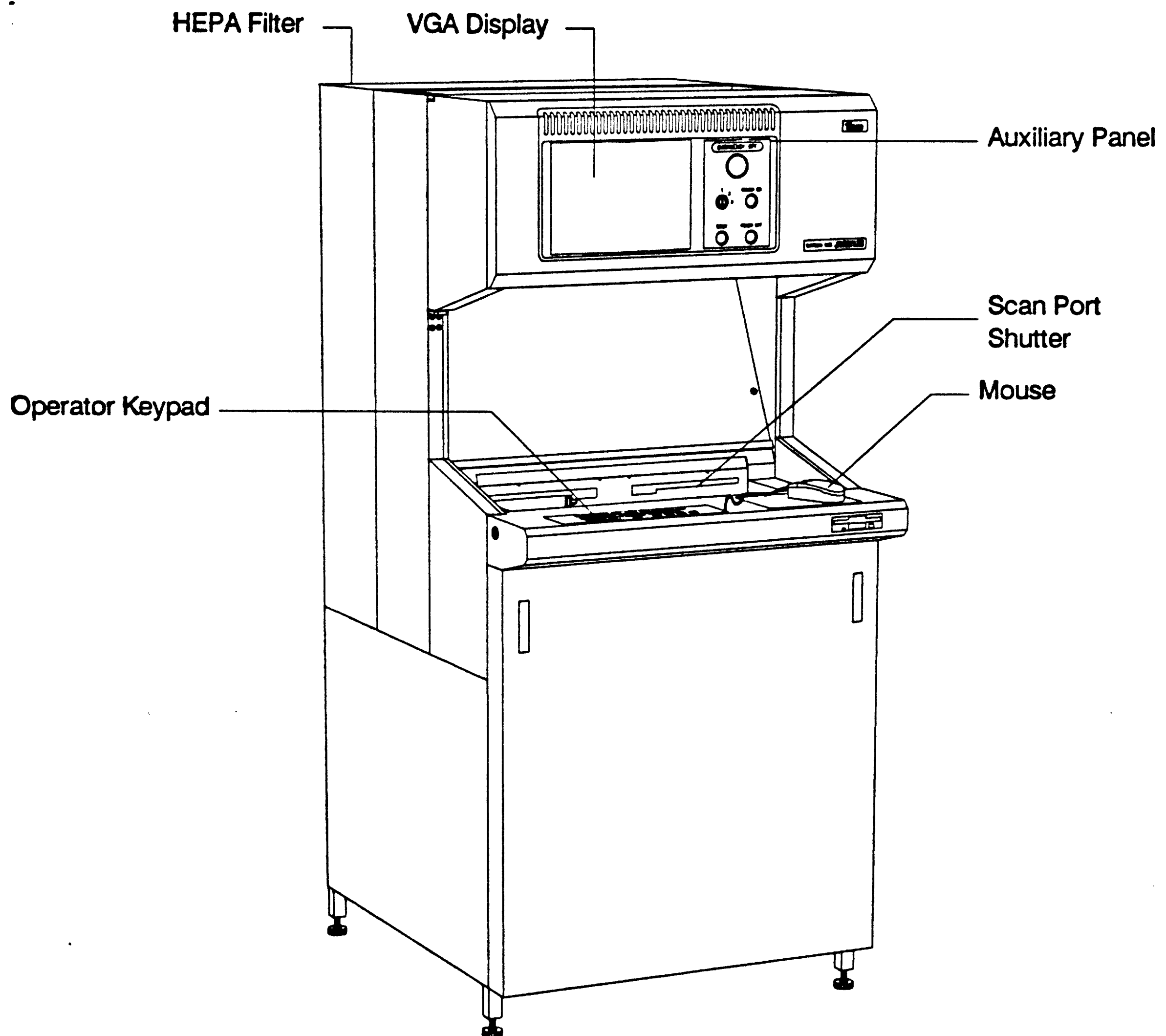


**Figure 1-1 Surfscan 6200 Wafer Surface Analysis System**

The Surfscan 6200 features Tencor Instruments microscan technology for collecting and three dimensionally plotting light scattered from substrate surfaces. Microscans simulate three-dimensional views of the substrate surface and are useful for identifying the characteristic shape of scattered light patterns from defects, contaminants, and other wafer features. For instance, scratches resulting from wafer polishing might appear as a linear group of events, or surface film from liquid residue can scatter light in a circular pattern. Microscan technology allows information to be obtained quickly and non-destructively without removing the substrate from the wafer.

## 1.1 KEY FEATURES

- The Surfscan 6200 application software runs under the Microsoft Windows 3.0 environment of icons and menus. Histograms and wafer maps are color coded to distinguish defect count ranges. Surfscan 6200 instruments are operated and programmed using either a keypad or a mouse input device.

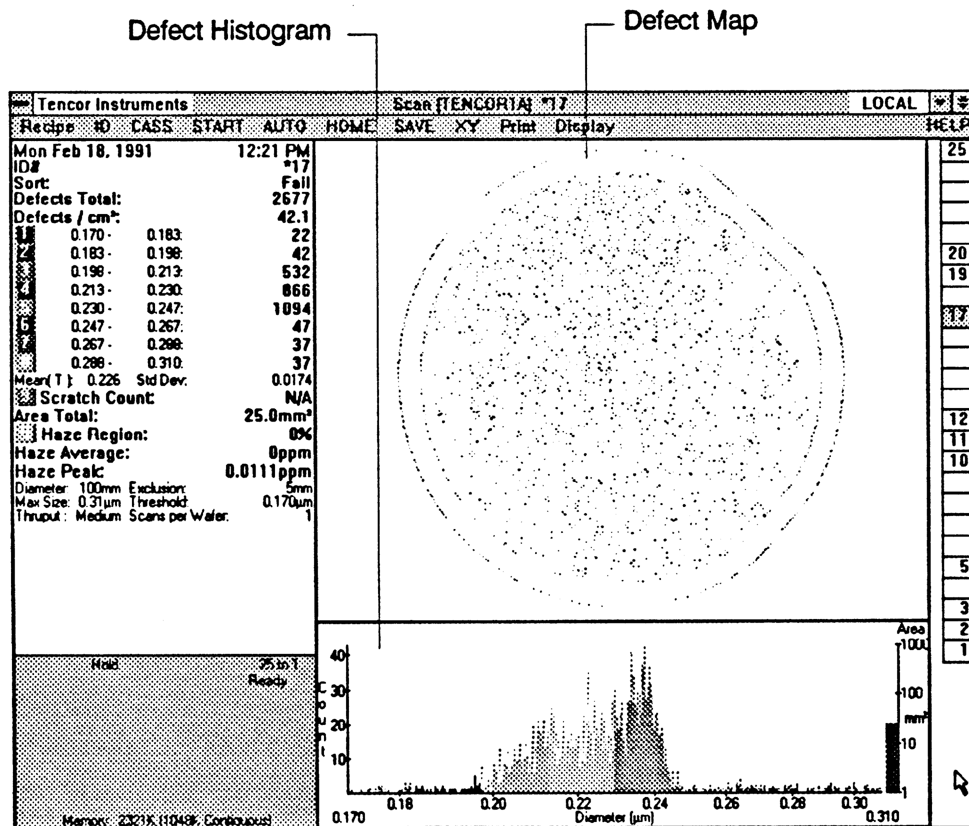


**Figure 1-2 Windows-Oriented Maps and Charts**

- An optional feature key is available to enable extremely accurate X-Y coordinate tracking. X-Y axes coordinates can be transferred to other instruments such as a SEM for further analyses. The wafer map information can be saved to a diskette in Tencor File Format and read into a DataHub for further analysis.

- The instrument provides a single-puck transport mechanism for handling wafers with minimum contamination. Wafer sizes from 100 mm to 200 mm are easily measured and an optional configuration is available to accommodate 2- or 3-in. wafers. The Surfscan 6200 has a small footprint (75 x 77 cm) that is designed to conform with the SEMI Standard for mechanical interfaces.
- Passed and failed wafers can be sorted into separate cassettes.
- Single-puck design minimizes wafer contact and reduces the potential for handling-influenced contamination.
- Microscan technology displays the surface topology of the substrate surface revealing characteristic light scattering distributions often associated with contaminant effects. The microscope feature is particularly useful for monitoring the quality of the substrate surface relative to specific defects, and can identify the existence of wafer features and defects below the threshold level.

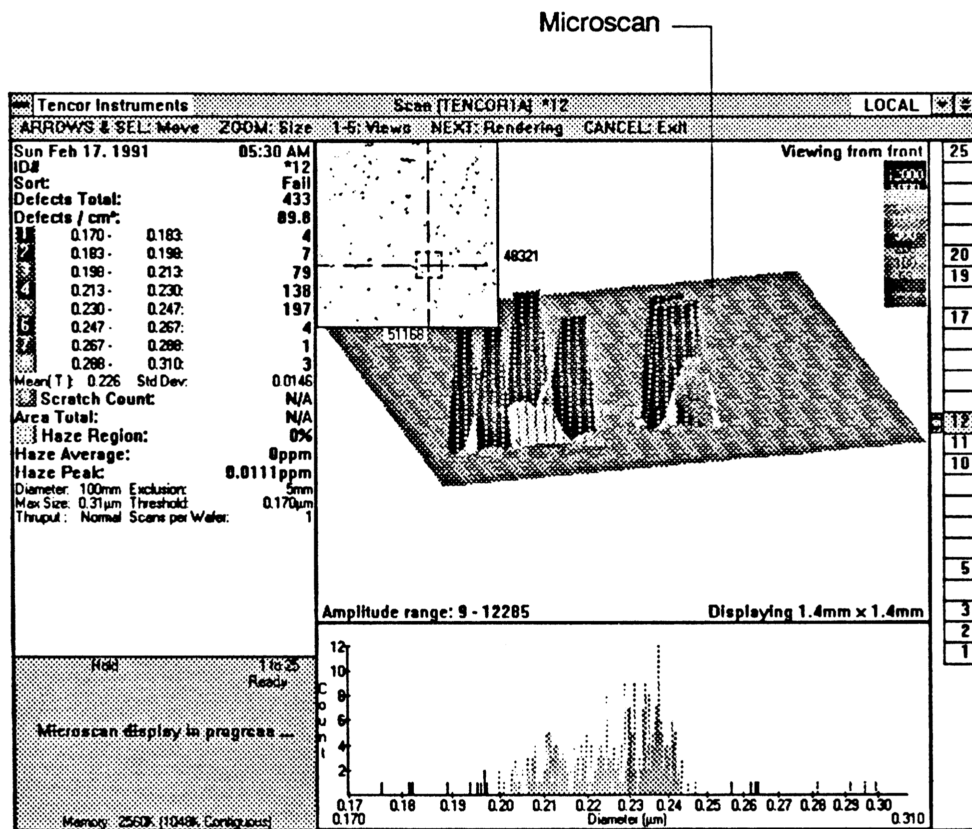


**Figure 1-3 Surfscan 6200 Microscan Technology Shows Surface Topology**

- Variable scan feature allows the selection of an optimal trade-off point between high throughput and sensitivity for specific applications. In the high throughput mode, the instrument processes 150 wafers per hour.

- Password-protected system. The user manager can access a separate menu system for user records, data, and system configuration maintenance. Separate records are maintained for every user; allowing the user manager to grant unique sets of access privileges to the users. Access to recipes and other confidential data can be restricted to selected users. The appearance of screens and display of data is dependent on the access privileges associated with the user password.
- Sophisticated calibration application supports multiple substrate types. Calibration curves for defect and haze data collection can be optimized to conform to a user-defined analysis criterion.
- High-intensity, 488-nm Argon-Ion laser and advanced digital processing for detecting, counting, and sizing defects down to 0.1 μm on bare silicon wafers.
- Database management system allows database queries, data export and import, system event audit tracking, and backup and restore operations.
- Customers can acquire an optional feature key from Tencor Instruments to enable bidirectional communications using the SECS-II protocol. For details, refer to the *Surfscan 6200 SECS Interface Manual.*