

Integrated Measurements for 200mm Process Tools

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- Advanced Process Control Products Group

MKS Integrated Measurements for 200mm Tools

- FTIR Reflectometer for Epi Thickness
- ProcessSense™ NDIR Sensor for Chamber Clean End Point
- FTIR MultiGas™ analyzer for Exhaust Gas Monitoring
- Vision 1000 RGA for PVD Contamination Protection
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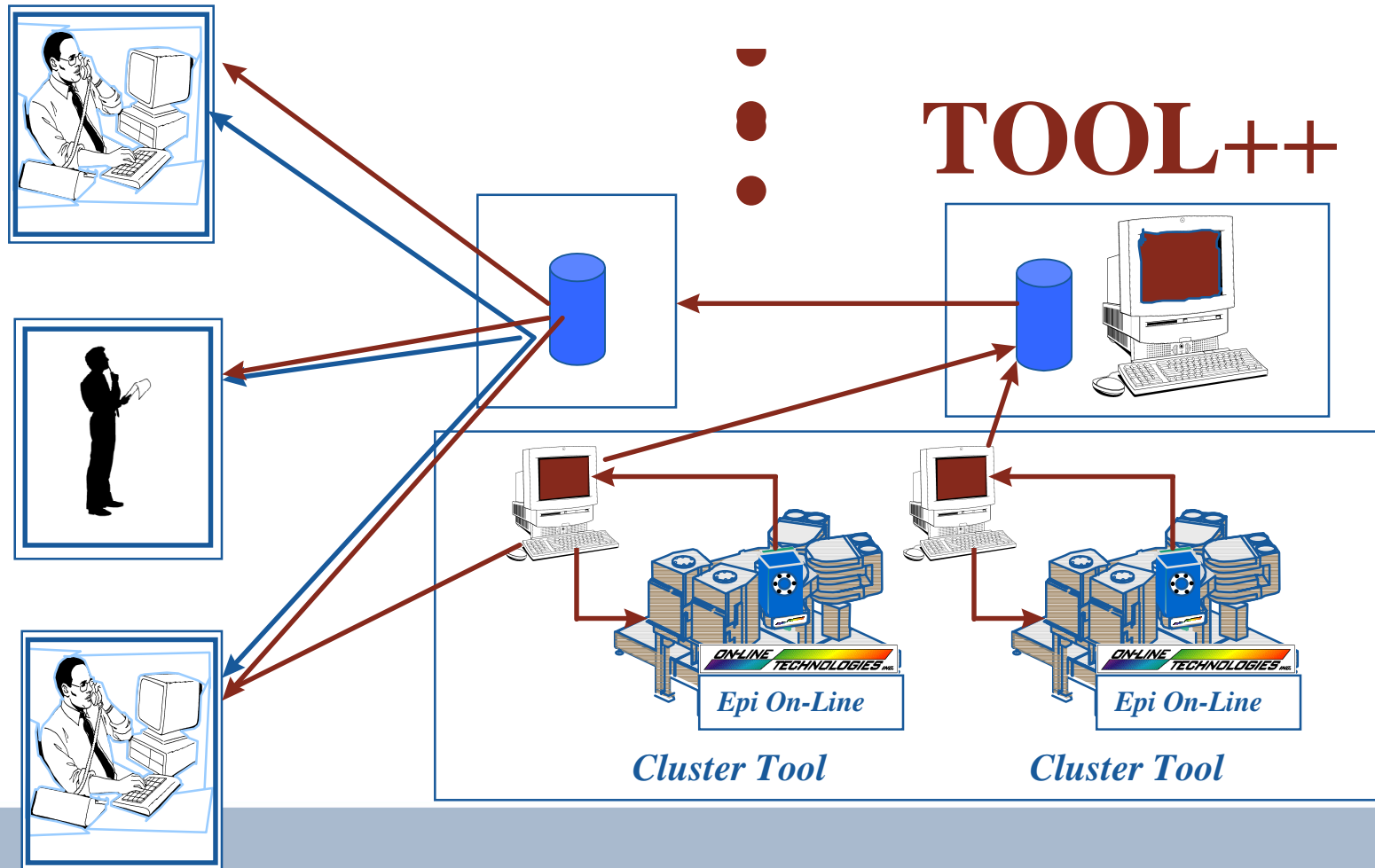
Integrated Metrology for



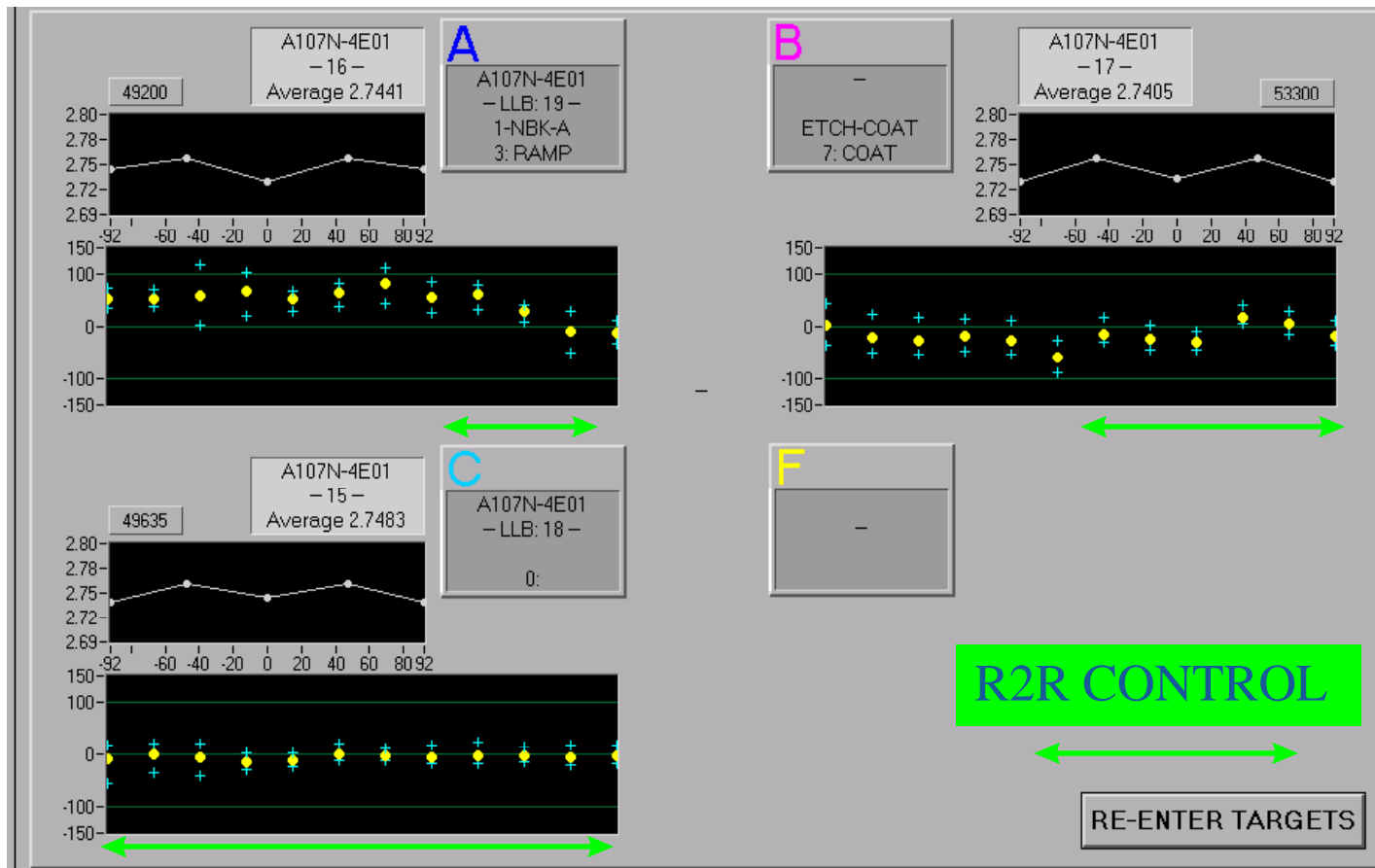
Epi On-Line™

- Tool Monitoring in Engineer's Office
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-
-
-

TOOL++

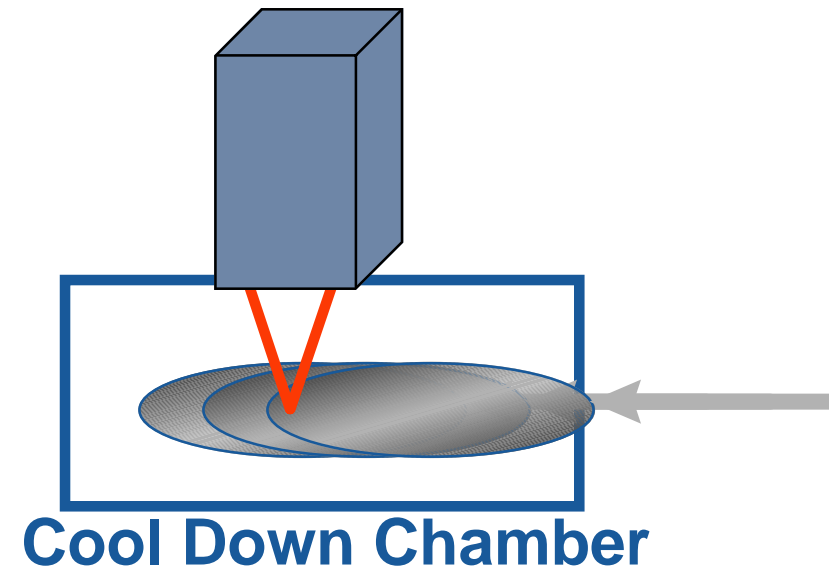


Run-to-Run CONTROL for Average Thickness

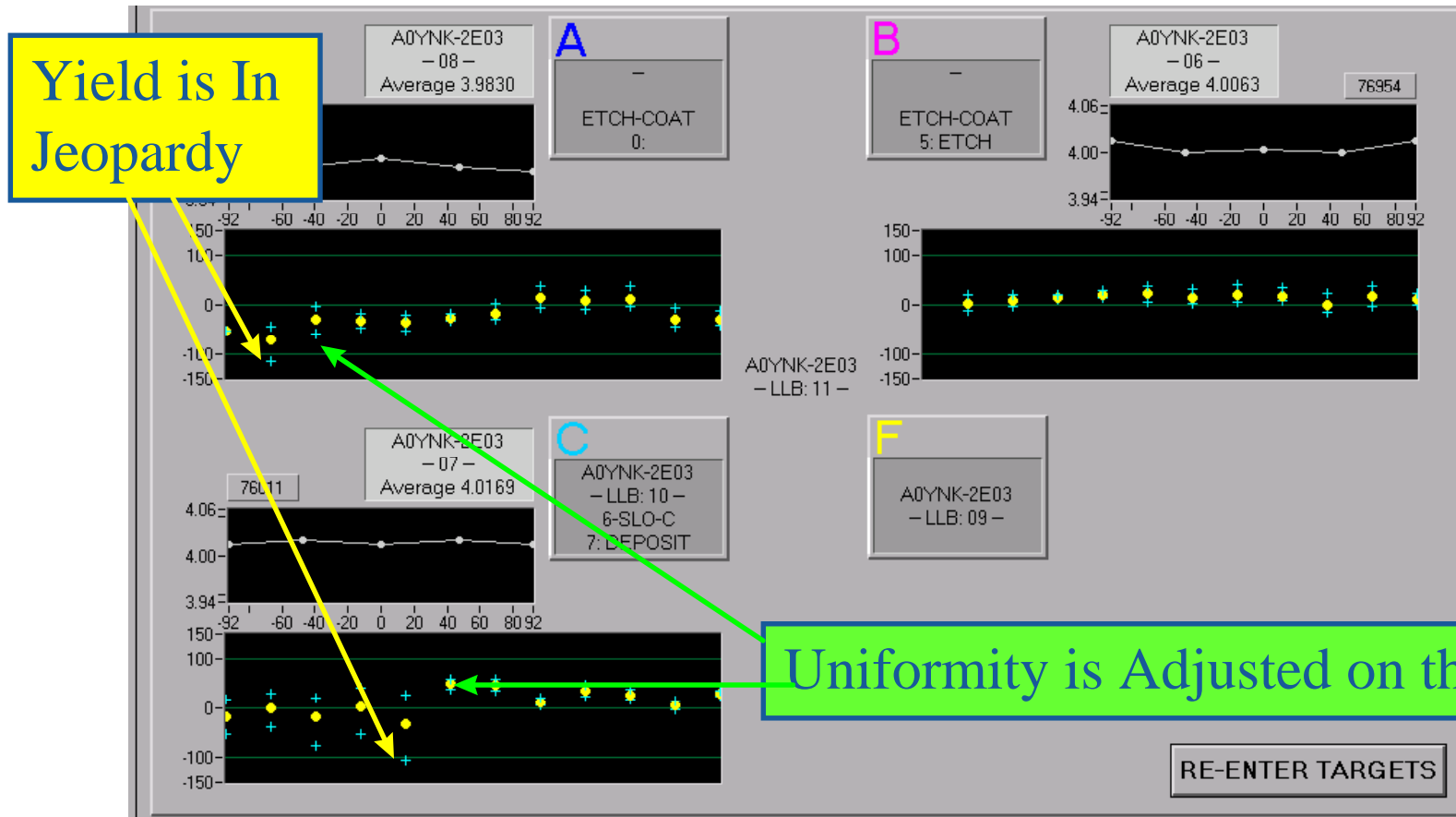


Multi Point Measurements

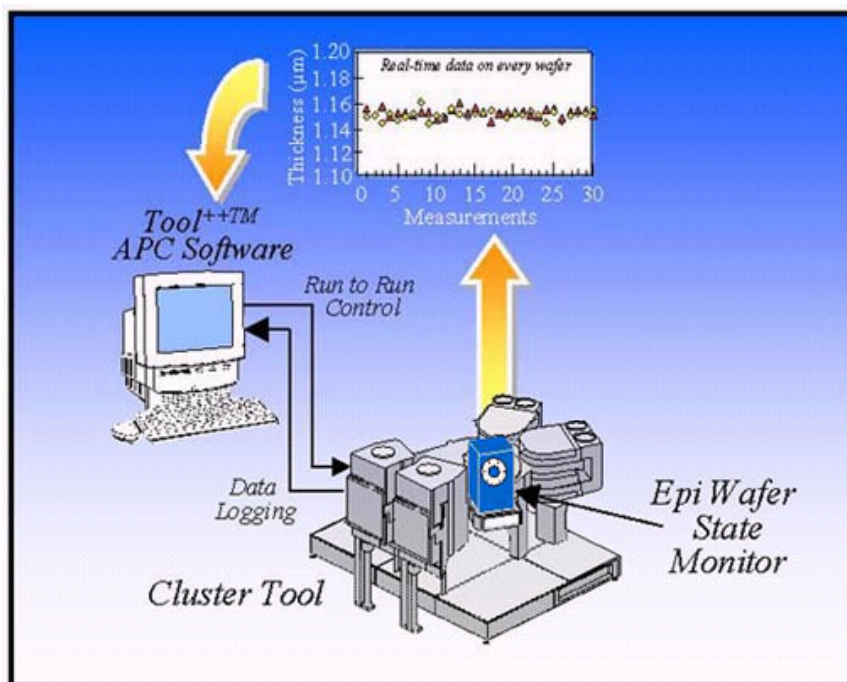
Wafer is moved by
the transfer robot
to measure up to
15 points



UNIFORMITY TUNING RESULT



Benefits of Integrated Metrology with Run-to Run Control

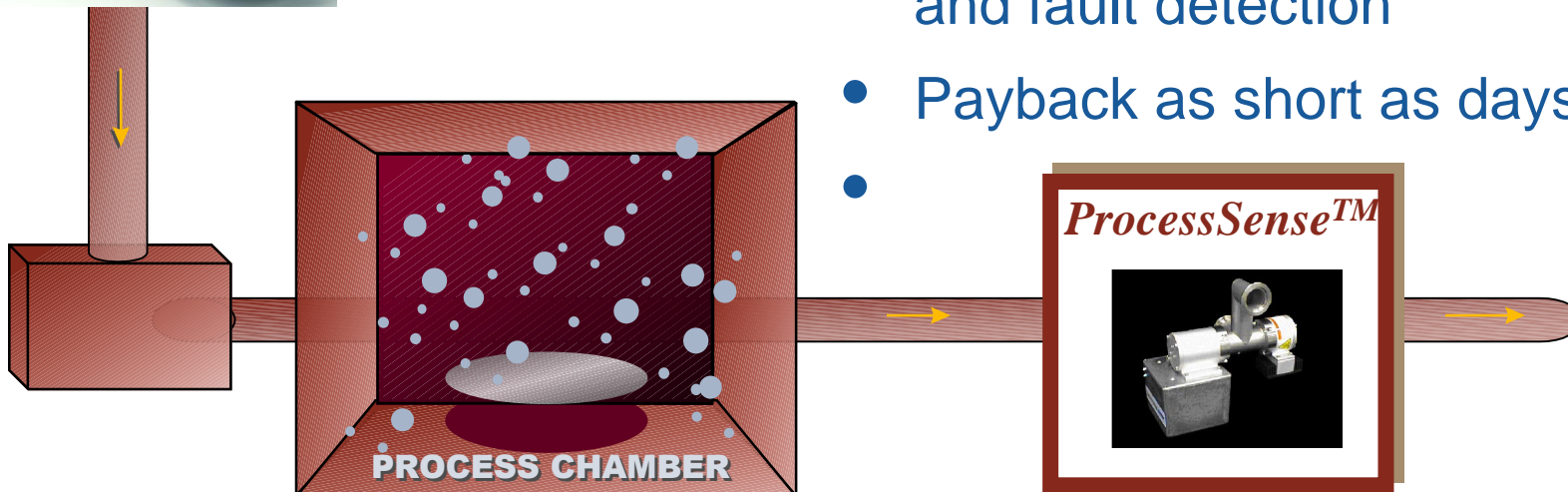


- 100% inspection
- Higher quality – 6 Sigma Process
- Higher yield
- Higher productivity
- Payback in a few months

ProcessSense™ for Chamber Clean End Point

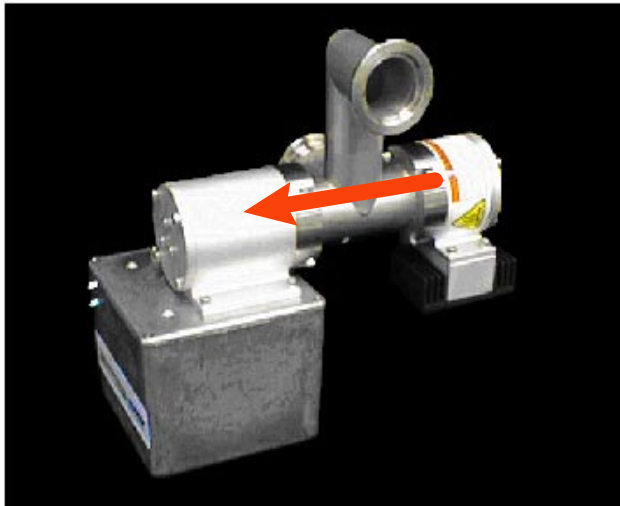


Astron Plasma Generator



- Active end point saves cleaning time **reducing material** and **increasing throughput**
- Provides data for e-diagnostics and fault detection
- Payback as short as days

ProcessSense™

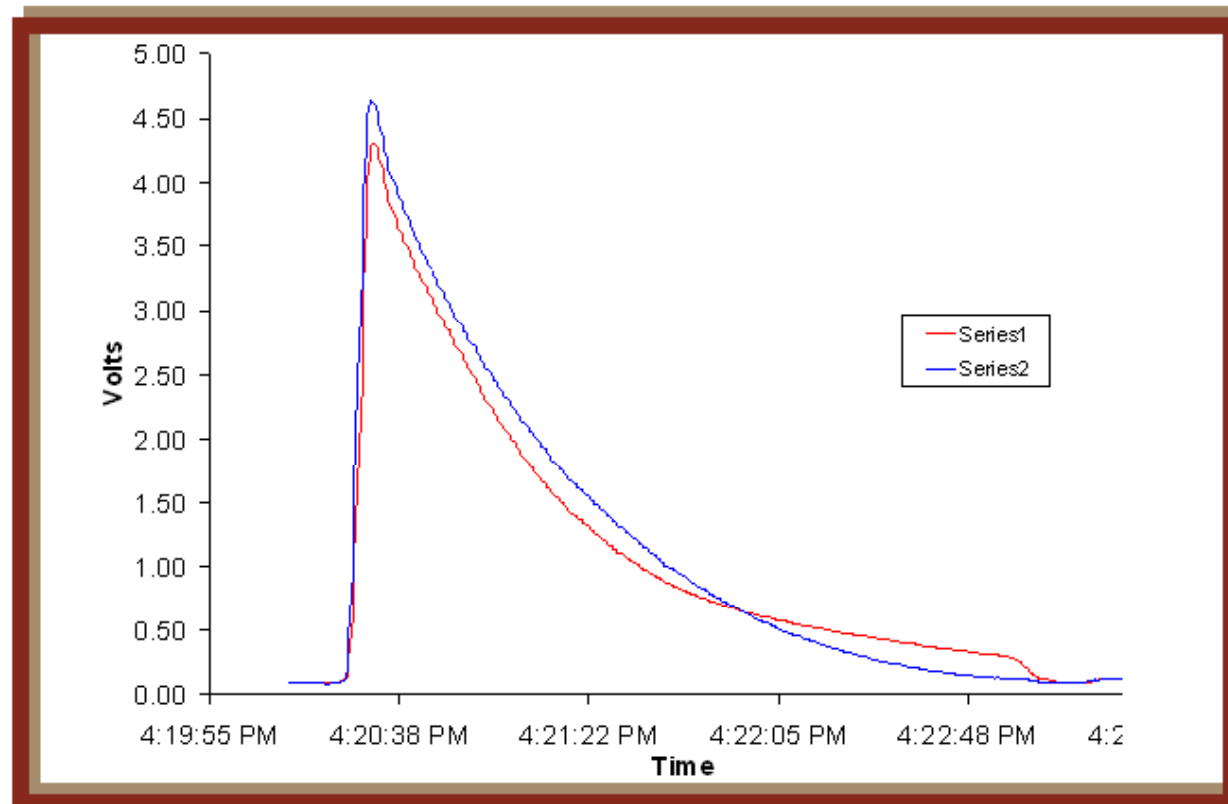


ProcessSense™

- Measures single species
- Concentrations down to milli-Torr or (sub ppm)
- 0.1 sec response
- Applicable to process, exhaust stack or end point analysis
- Integrated into gas line or exhaust duct

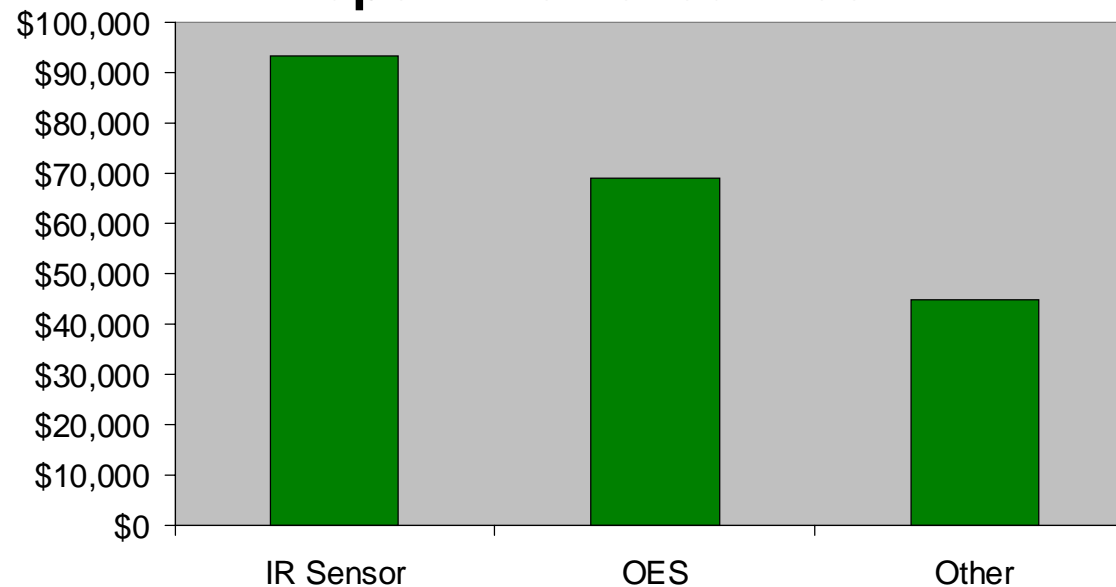
Infrared Beam Passes Through Gas Stream

Effect of Process Variability on Endpoint Detection

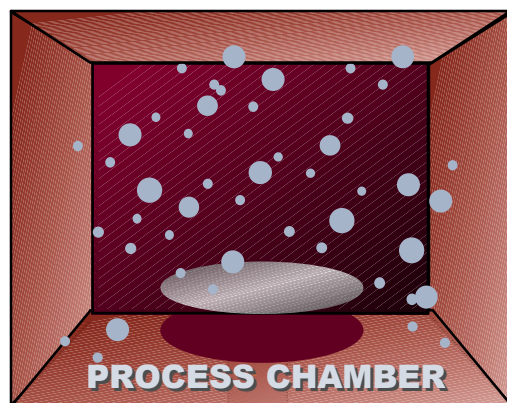


Total Monthly Profit Increase

Monthly Profit Increase vs Timed Endpoint Bottleneck Tool



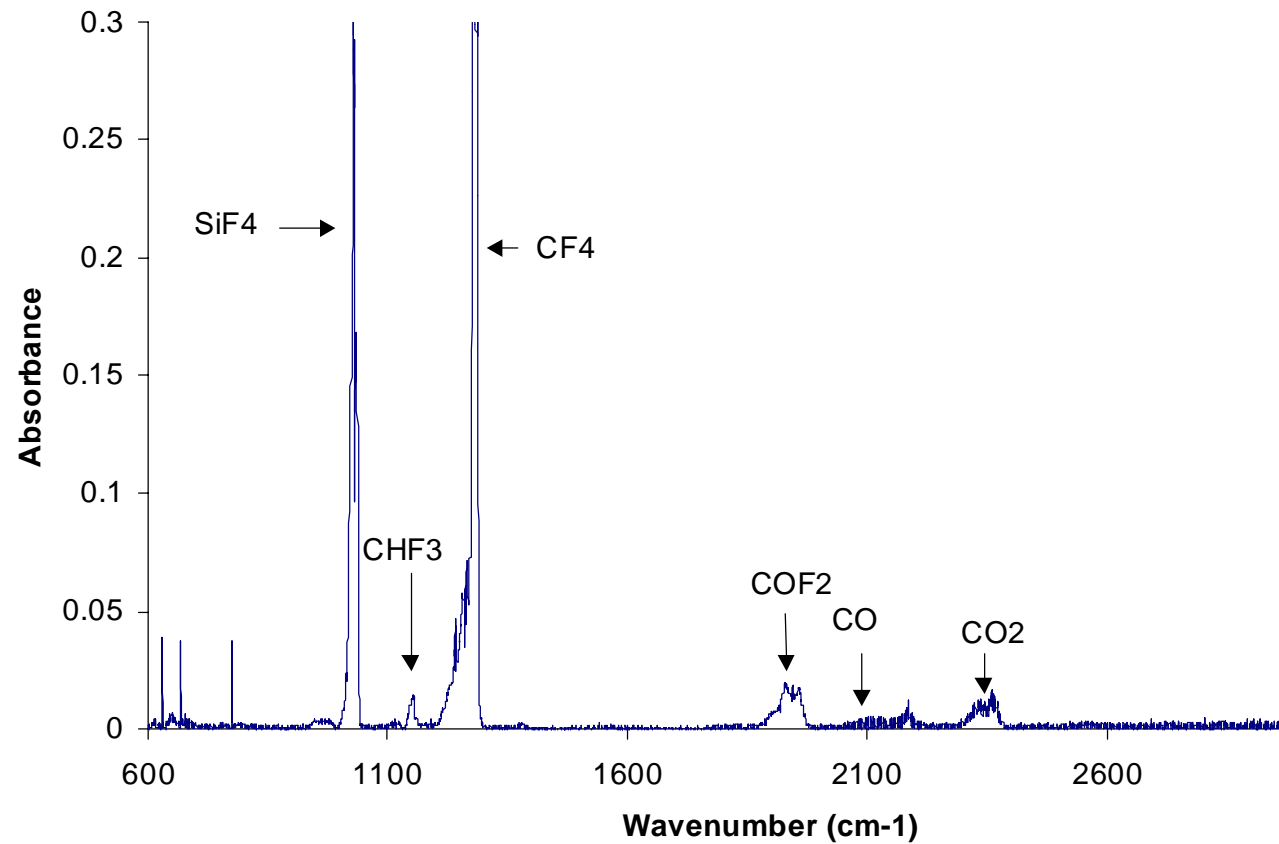
Process Exhaust Gas Measurement for Etch



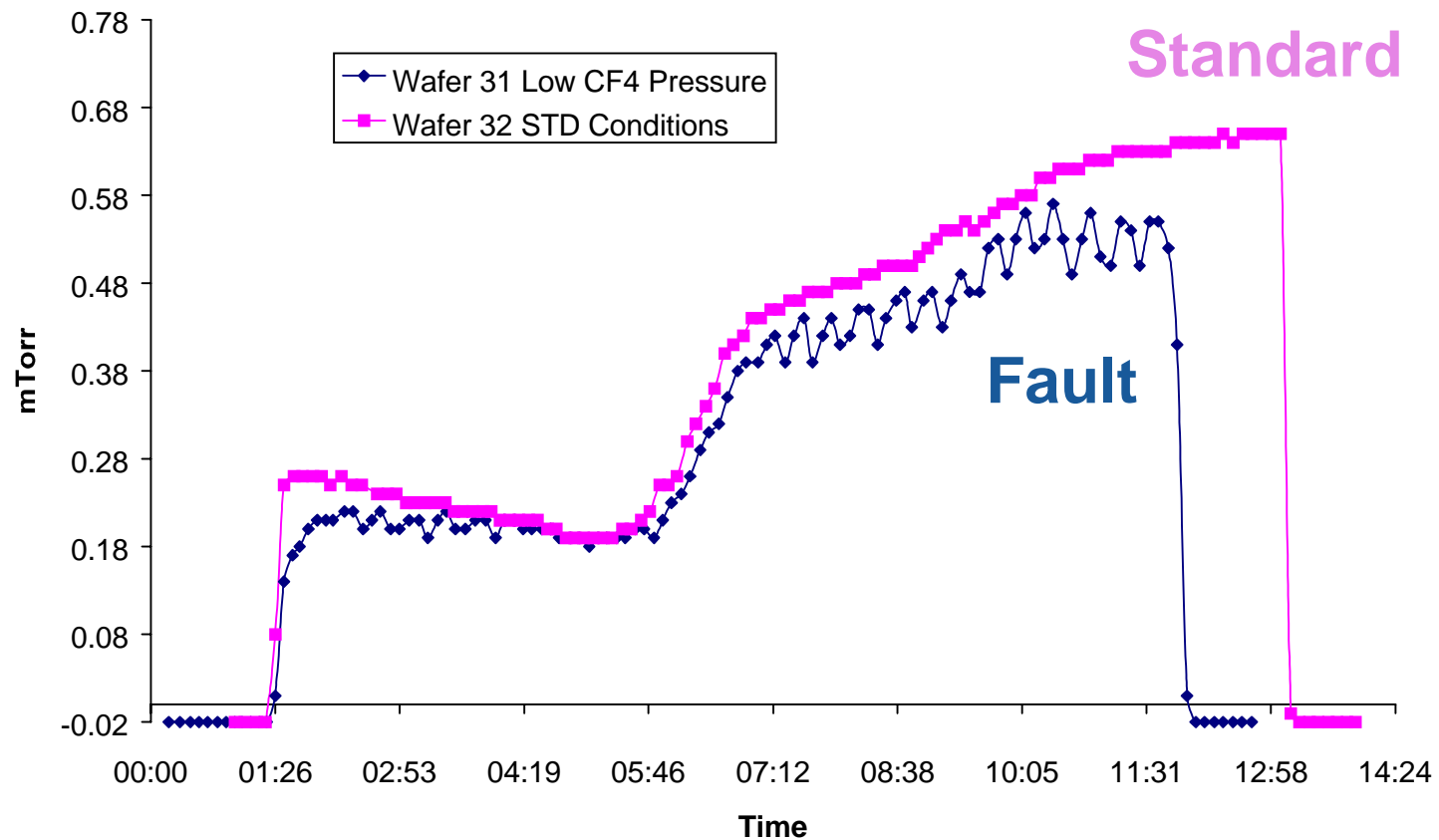
FTIR MultiGas™ Infrared
Gas Analyzers



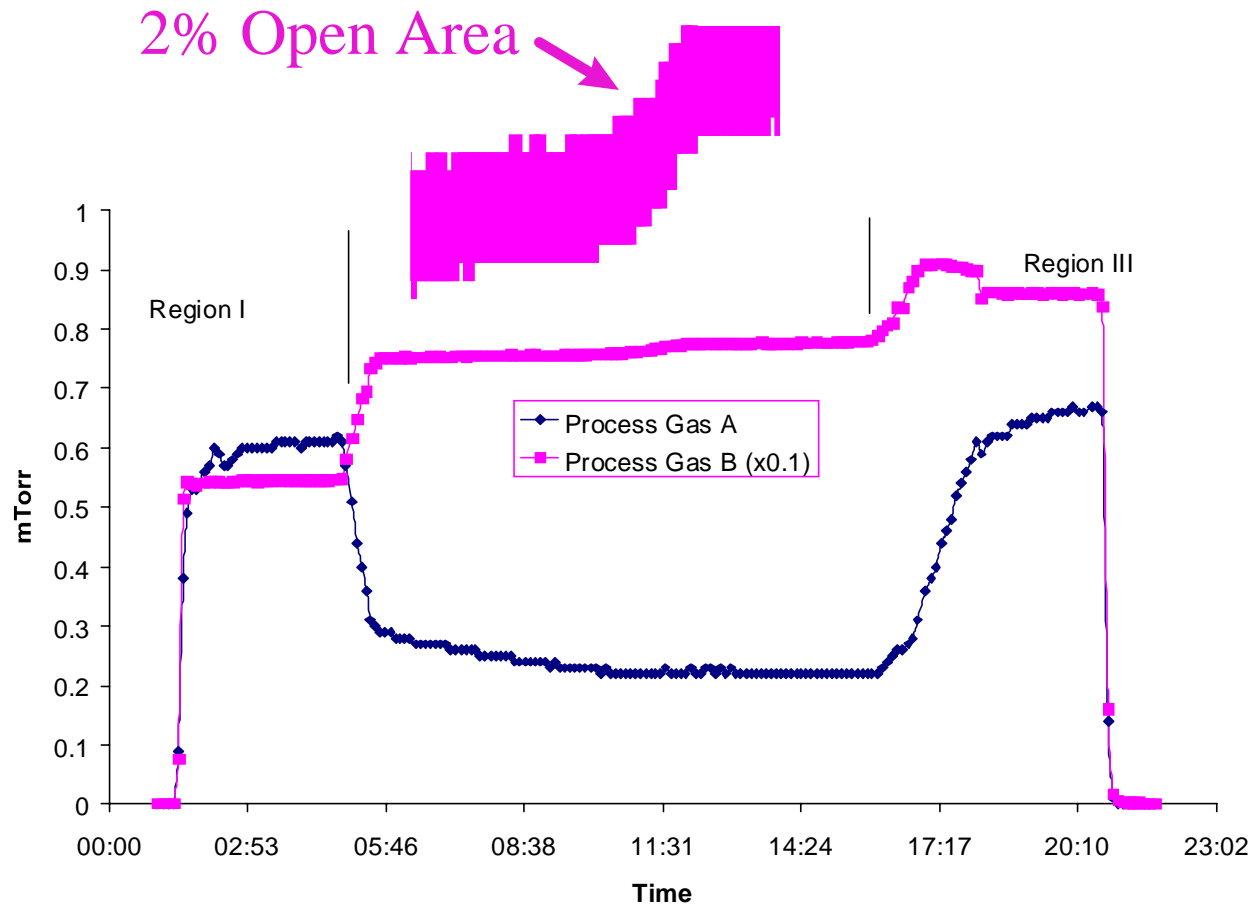
IR Spectrum During a Wafer Etch



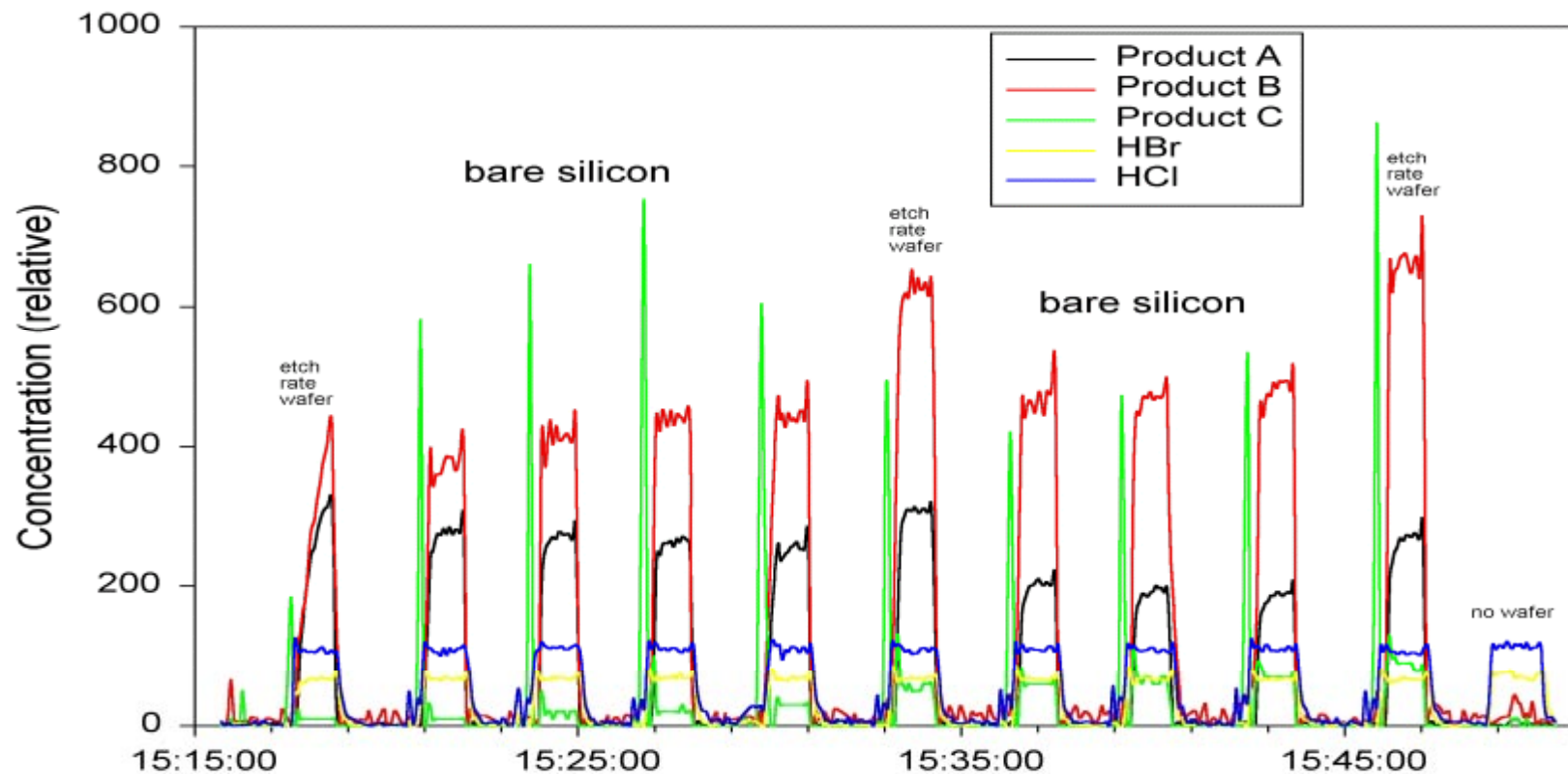
Fault Detection and Classification



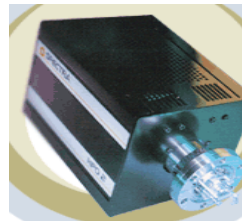
Determining Etch Chemistry



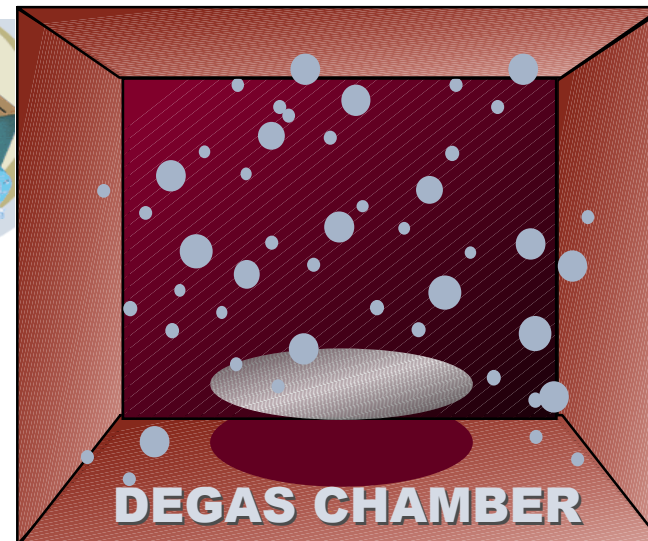
First Wafer and Warm Up Effects



RGA Gas Measurement for Contamination Control



**MKS RGA based
Cluster Tool Profiler
measures gas in
degas chamber and
process chambers**



Cluster Tool Profiler

RGA process monitor for PVD Tools

- Real-time data monitoring and control for degas, pre-clean, and deposition processes
 - **WARN** and **STOP** levels from preset alarm conditions
- Enhances tool productivity
 - Helps avoid unnecessary kit changes
 - Faster recovery from PM
- Enhances yield
 - Detects anomalies within the chamber before wafers are scrapped or yield is decreased
 - Provides evidence to help troubleshoot upstream process anomalies

Applied Endura PVD Tool