

Success story

AU Optronics Gets Higher Margins Using Predictive and Prescriptive Multivariate Data Analytics

A leading manufacturer of flat panel displays was looking to implement cutting edge technology that would make them unique in a very competitive world. They found it in the Umetrics® Suite from Sartorius Data Analytics. The Umetrics Suite helps the company understand and detect developing problems – and correct them – in real-time. The result is higher margins and a valuable advantage in a highly competitive market.

“There’s nothing simple about making flat panel displays,” says Johan Hultman Manager – OEM & Partners for Sartorius Data Analytics, “Hundreds of steps, and thousands of variables make manual process monitoring in real-time impossible. Production errors result too often in faulty displays that have to be reworked or even discarded – at great cost. We knew continuous process monitoring would give our customers an edge. Multivariate Data Analysis (MVDA) from the Umetrics Suite has proven to be the answer for AUO as a leading FPD maker. It has provided the deep understanding of critical issues needed to increase productivity and yield and to improve the quality of the products.

Mvda at Work: Three Examples

Three application based on Umetrics Suite components have been particularly beneficial. They are:

- Virtual Metrology (VM)
- Sequential Modeling
- Equipment Health Monitoring (EHM)

All three were developed with the support of Sartorius Data Analytics.

Virtual Metrology – early detection and correction Sartorius Data Analytics helped the company develop a custom virtual metrology (VM) solution based on SIMCA methodology for monitoring Photo Space Height (PSH). PSH is a critical parameter in obtaining the correct amount of

liquid crystal filling. And the correct amount of liquid crystal is, in turn, a critical parameter for panel quality. The solution uses the model built by historical process and sampling metrology (i.e., PSH) data to predict quality immediately following the completion of specific process steps and thus reduces yield loss by 3-5%. Other benefits include increased productivity based on up to 50% less time spent on measuring and lower expenditures on the rework and repair of faulty panels.

Sequential Model – Deep Understanding

A sequential model created with SIMCA for monitoring critical issues across multiple steps provides a deeper understanding of critical issues as well as much as 30% earlier detection of critical issues. The model is employed for real-time monitoring of issues caused by the complex multistep production process and the interactions of the many variables in each process.

A top-level model was made using multivariate indicators created from sub-models of all the sequential processes identified for critical issues. The model allows the quantification of how each process step contributes to the development of a critical issue and thus makes it possible to monitor both critical issues and individual processes simultaneously.

Equipment Health Monitoring – More Stable Yield

In addition to monitoring production processes, the company has also put multivariate data analytics to work to improve

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“It’s provided the deep understanding of critical issues we need to increase productivity and yield”

their equipment health monitoring system. With Umetrics Suite, they can now monitor the multivariable indicators, which reflect the status of equipment to detect the potential degradation of the equipment performance earlier before the equipment is out of service or produce low quality product.

This allows them to better plan for maintenance. In contrast, previous reliance on preventive or condition-based (by monitoring single variables) maintenance was much more likely to lead to overlooked equipment deterioration and unplanned downtime, and thus to less stable yield.

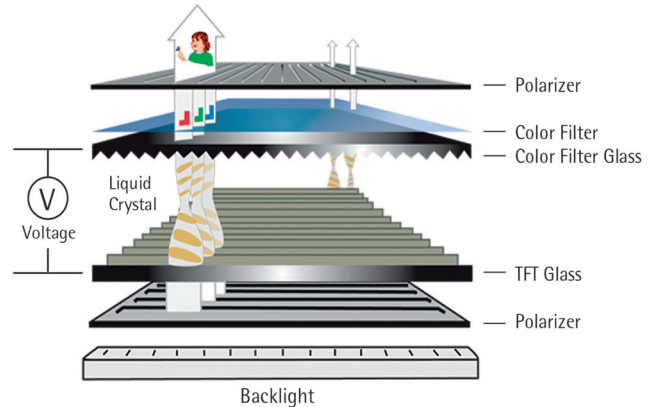
Proven, Turnkey Software for Proactive Action

The Umetrics Suite has helped the company become more competitive. It’s a turnkey software solution that, among other things lets users monitor even complex, multistep process in real time to predict critical issues and make corrections before quality is affected.

A Most Satisfactory Partner

“Sartorius Data Analytics is a highly supportive, always-responsive partner. They have helped us develop applications that suit our own specific requirements.

And they have actively supported us in setting up our own in-house data analytics team and knowledge transfer to ensure the ongoing success of our endeavor. All in all, we’ve been thoroughly satisfied with Sartorius Data Analytics. The Umetrics Suite has had a clear impact on our productivity and the quality of our products.” says a Manager at AU Optronics.



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The customer:

A global leader in optoelectronic solutions and the first pure TFT-LCD manufacturer listed at the New York Stock Exchange (NYSE).

The challenge:

Use continuous process monitoring to gain a competitive edge in a highly competitive market.

The solution:

Virtual methodology, sequential modeling and equipment health monitoring facilitated early detection and correction, better domain understanding and a more stable yield.

The result:

Yield increase by 3-5 % and productivity increased based on 50% less time spent on measuring and lower expenditures on the rework and repair of faulty screens.

SIMCA® and SIMCA®-online solutions from Sartorius Data Analytics

SIMCA® Multivariate Data Analysis Solution and SIMCA®-online solution are part of the Umetrics® Suite of Data Analytics Solutions for real-time process monitoring and multivariate analytics.

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