

## EDA is Critical to Yield Enhancement!

In this age of lightening fast technological evolution having systems to back-up your Fab investment is critical. Engineering Data Analysis (EDA) is one such system. Empowering your Engineering team to rapidly analyse your Process, Integration and Yield opportunities to drive a World Class Yield Enhancement Roadmap.

### Technological Evolution!

Fabs introduce new technologies, processes and products weekly. Aggressively driving change is critical for time to market and maximizing your profit. Introducing a new technology or product, ramping it into High Volume and then sustaining it with high yields, is business as usual.

**Don't stop short!** Protect your investment with a system to turn the wealth of engineering data into real improvements.

### Engineering Data Analysis

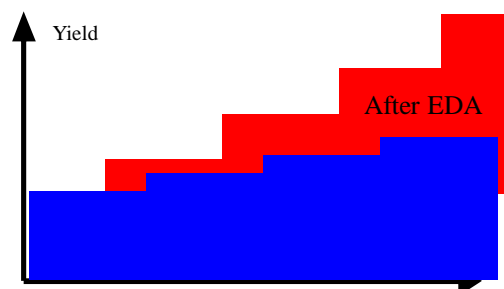
Use EDA to take yield data from Wafer Test, perform parametric and defect sensitivity analysis. Find those correlations between yield, defects and device characteristics. Screen out the nuisance defects from the killers. Go the next step; correlate the same parameters to in-line monitors and unit process variables. Use these discoveries to make informed decisions about possible integration and unit process improvements.

Now run the Process Window or Design of

Experiment lots. Extract the results and analyse the same relations again to validate those theories. Publish the data, reports, charts and statistics to justify the pilot production proposal. Monitor that pilot program using the same EDA system and confirm it matches expectation.

Conclude the Yield Enhancement project; pull the full analysis together from Discovery, through Experimentation, and Pilot production to confidently convert the line.

Imagine empowering every one of your Engineers with the same capability!



### Benefits \$\$\$

**Quicker debug:** Assume 30 events (0.5% loss) / QTR. EDA saves 1 day loss each.

**More Improvements:** Assume 2 extra improvements (0.5% gain) / QTR. 350 DPW & 30K wafers / month

$(30 \times 0.5\% / 90\text{days}) + (2 \times 0.5\%) \times 350 \times 90\text{K} \times 1\$ \text{ profit/chip} = 367,500 \$ / \text{Quarter. (Approx. 1.5 Million USD\$ / year extra profit)}$

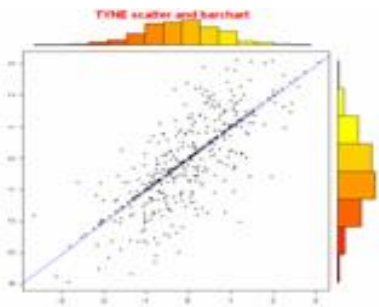
Installing an EDA system has a guaranteed Return on Investment of less than 6 months.



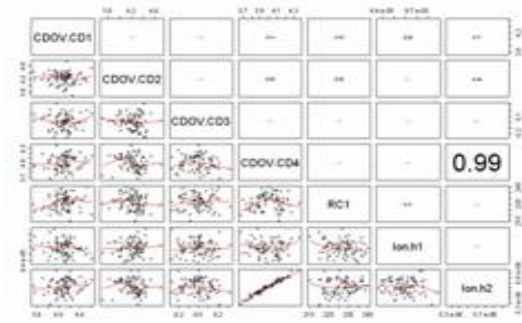
## Yield Enhancement

During the relentless technological march described by Moore’s Law, the IT infrastructure and software tools available to Fab Engineers have evolved beyond recognition. However, some 40 years later, the principals of good Engineering and problem solving are just as valid today. Having the ability to take several data types and correlate between them to find problem sources and new opportunities, are critical to the daily activities of a successful Engineering team.

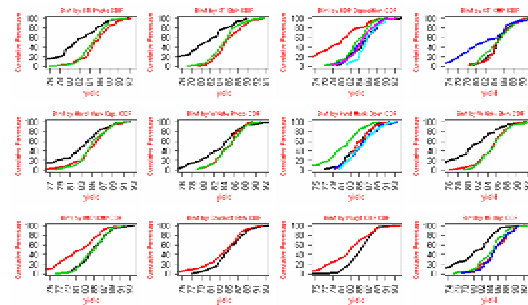
**Correlate All data types:** The most fundamental capability is the ability to verify a possible relation between a Yield variable and Electrical test and/or in-line parameters. AYEDAS loads all data types (In-line, Defect, ETest, Wafer Test & Final Test) and allows the engineers to extract weeks of data (e.g. Yield) and correlate it against any data type.



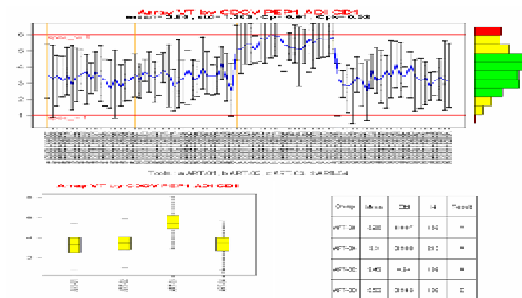
**SHOTGUN Correlation:** However in an excursion, the relations may not be known and the debug team needs to quickly find the dependency. With AYEDAS, the engineers can deploy SHOTGUN correlation and check 100’s of parameters in minutes. Like for Scatter Chart, all data types can be cross correlated. E.g. Inline CD’s vs. Etest.



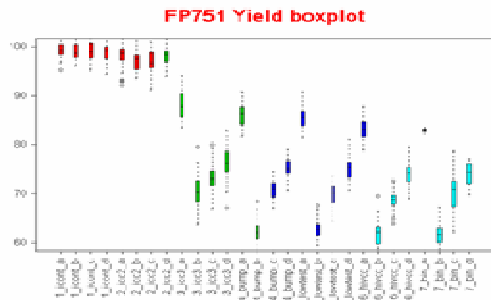
**Process Monitoring:** Having a well matched manufacturing tool set is essential to successful Yield Enhancement. Not only does it lead to improved process stability (less excursions) but also increased clarity (less noise) in finding new opportunities. Using AYEDAS to establish a Batch CDF job, the performance of every tool in the Fab at every operation can be reviewed in minutes!



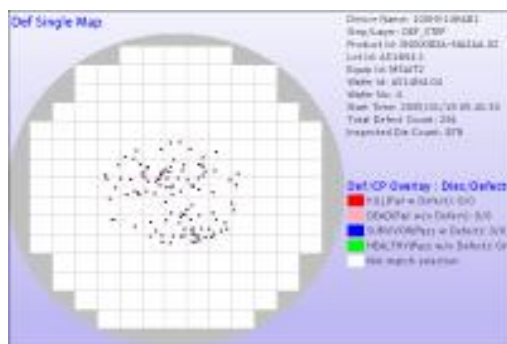
Drilling down to get more data at that operation can be as instantaneous as a simple click on the interesting chart. An integrated ANOVA test will tell you if the difference is real and statistically significant.



**Experimental Analysis:** Part of every Fab Continuous Improvement mission is to run experimental trials to investigate and verify process improvements. AYEDAS provides several functions dedicated to experimental analysis. E.g. After defining the experimental split table, the Yield results can be tabulated and plotted accordingly.



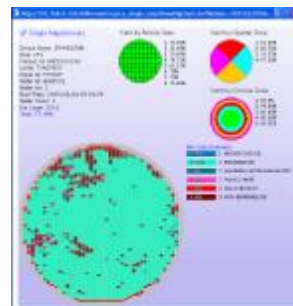
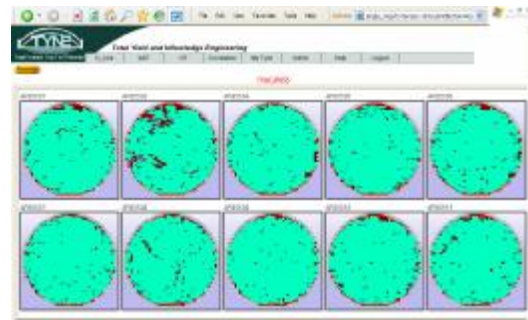
**Mapping: Yields, ETest, Defects...** Of course charts are not the whole story – a picture says a thousand words. However as with the charts every data type can be mapped and in some cases two data types may be overlaid together to understand the relation e.g. Wafer Sort results overlaid with Defect Inspection data. The Hit/Miss and Kill Statistics are displayed in the legend.



The Defect review station images are just a click on the map defects!

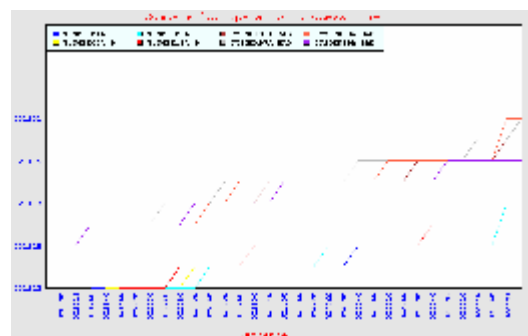


Composite or multiple single maps are available for every data type.



Drilling down on a map will reveal the individual wafer map details including Regional & Reticle analysis

**Advanced Analysis:** Completing the Analysis suite is a series of commonality and Data Mining tools to complement any Fabs excursion debug armoury. AYEDAS includes the usual Good / Bad and Timeline analysis tools as well as its own technologies, HiLo and TyneCom (Patented IP).



Be the user a new engineer or one with many years experience, the embedded Help files and intuitive User Interface will allow him or her, to fully exploit the system to realise many new Yield Opportunities.



**AYEDAS™ – The System.**

The success of an EDA system is measured by how many people use it. AYEDAS was designed for ease of use with all the stakeholders: IT Team, Super / Novice users and Remote users alike.

**WEB Based EDA:** Easy deployment; low maintenance; integrated help; complete Group / User / Applications management and usage Statistics are all aspects to appeal to the IT Manager. Couple that with the quick addition of new functions by your own IT staff (cooperating with TYNE's dedicated development team) means a very satisfied Engineering customer base.

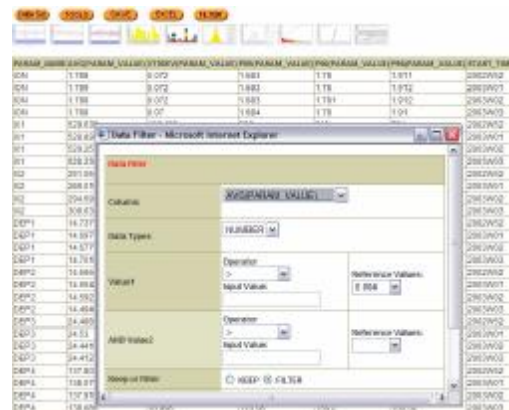


**Remote access:** Starting multiple EDA sessions is as simple as starting your Web browser. However not all the sessions need to be just in the local Fab. An Integration engineer can compare a local Fab trend vs. the development Fab on another continent. The Project Manager at the headquarters can review the latest Test results with the local Test Engineer. Even your foundry customers can use the same EDA system. Establish User accounts for each customer, enabling a subset of the functions and to view their products only.

**Data Extraction:** Be it debugging your data integrity during a Fab start-up or a Super User's quest for raw data, the Data Engine is designed to give quick menu driven access to the EDA database.



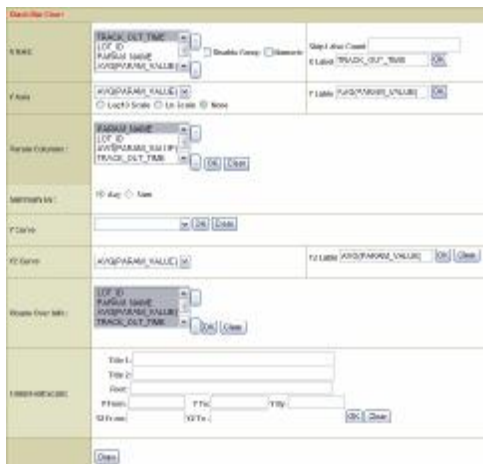
**Data Manipulation:** Once you have the data, use the data filter and mathematical functions to aggregate the data (by unit, time, parameter, etc.) and calculate the data set statistics real time.



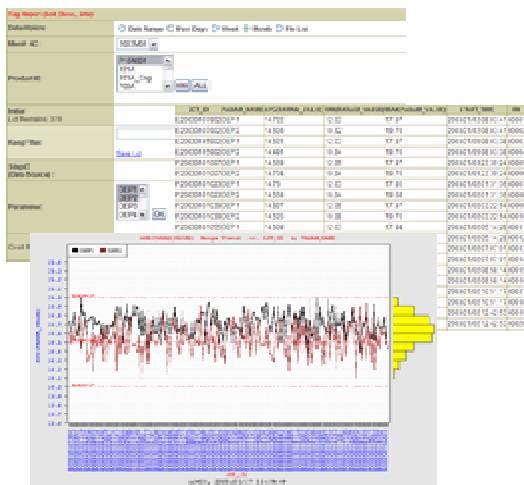
Once the data set is complete, publish it with Report Tool or Chart Tool, save it for later, or export it to another statistical analysis package.



**Tool Based Analysis:** AYEDAS allows two user styles: Tool based analysis for the IT specialist and Super User. In these menus, no presumptions are made to the user's intention. The user extracts, refines, tweaks the analysis and final output to their exact needs. E.g. Stacked Bar: Just one of many charts types. Select data column for each axis, add a 2<sup>nd</sup> axis, add mouse over info and customise the Titles, axis labels.

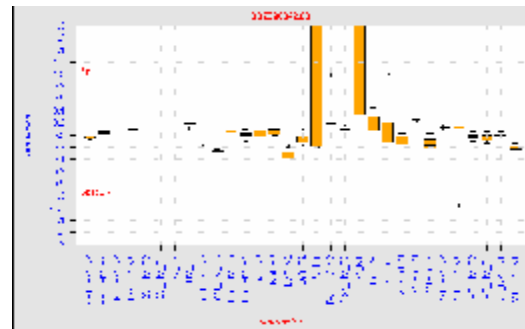


**“Off-the-Shelf” Analysis:** Alternatively, as a novice user or standard reports may be required, then let “Off-the-Shelf” functions be the analysis choice. Select from several prepared reports, charts and map analysis functions. E.g. Etest Lot Report & Trend.



**Customised Analysis:** Customisation is by two means. Firstly by configuring the Tool based interfaces directly to produce the desired GUI fields and data output. In 95% of user requests this satisfies the Engineering customisation requirements and will be prepared before the 1<sup>st</sup> release. The remaining 5% will be customised specifically by TYNE's development team forming the 2<sup>nd</sup> release.

For Example: *WAT Single Lot with Multiple parameters trend.* A lot level box plot of each parameter on a normalised scale.



A 3<sup>rd</sup> release is after some 6 months of system use, when the Users fully understand their very specific needs.



**Conclusion:** World Class Yield Performance demands leading edge Engineering Data Analysis. Call now to see how AYEDAS could work in your Fab.

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