

DPlus

Test Data Analysis Tool

A new kid on the block



Where are we talking about?

- **Every device needs to be tested**
 - ▶ Consider an airbag with a chip to detect a crash
 - ▶ You don't want the airbag to blowup in your face just when tapping the dashboard
 - ▶ Need to test if the detector operates within limits
- **Testers collect data**
 - ▶ During wafer test and final test
 - ▶ This results in data files that need to be analyzed
- **Questions to be answered**
 - ▶ Does the device operate within spec (limits, spread)
 - ▶ Does the tester work within spec (dirty needles, sites equal, contact)
 - ▶ Is my process stable over time (Cpk)
 - ▶ Is my process repeatable/reproducible (GRR)



Some use cases

- **Test environment dependencies**
 - ▶ Asses site-to-site variation
 - ▶ GR&R analysis
- **Production well within limits**
 - ▶ Cp/Cpk analysis
- **An analysis tool should provide**
 - ▶ Clear visualization of problems
 - ▶ As little work as possible to assess the test data



Common Workflow at Salland

1. Test 1 part n times

- ▶ Check repeatability

2. Test different setups

- ▶ Test n parts 2 times at system1
- ▶ Test n parts 2 times at system2
- ▶ Check repeatability and reproducibility using GR&R

To support this flow DPlus offers

- ▶ Repeatability table
- ▶ GRR table

Why a new tool?

- We want features needed by engineers
- We want it to be intuitive and simple
- We want a modern look & feel
- We want a fast tool that can handle a lot of data

- What we want = what our customers want



Computers get faster, but old tools stay slow



Like your engine is
running on 1 cylinder

DPlus will run on all cylinders at full speed

Strategic positioning of DPlus

Test Data analysis tool
to support engineers

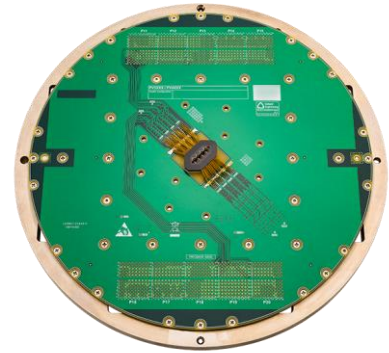


Not for plant optimization
or process control



Targets multiple domains

- Test Program Development
- Test Fault Analysis
- Part Characterization
- Instrument Design Verification and Characterization



Our Approach

- **Make our own operations faster**
 - ▶ Test Program development / Characterization
 - ▶ Design validation for Instruments
- **Use our expertise in data analysis to create a good tool**
 - ▶ Made by engineers for engineers
 - ▶ We can provide smart algorithms and workflows
- **Let our customers also benefit from it**



The first benefits are already visible

- **Accept more data sources**
 - ▶ STDF, CSV, TDF, board specific diagnostics
- **Quick exchange with Excel**
 - ▶ For the diehards
- **Automated data source processing with CLI**
- **Rit-DB and TEMS support under investigation**



What makes this tool different?

Ready for the future

- **Modern look & feel**
 - ▶ Like Microsoft Office, with ribbon, etc.
 - ▶ Docking windows, tabs, collapsible panes.
- **Easy to understand**
 - ▶ Explorer pane shows the data flow
 - ▶ Ready made building blocks for your analysis
- **Fast**
 - ▶ Multicore support, uses all your processors
 - ▶ Fast math libraries
 - ▶ Native DirectX for wafer plots



User Interface

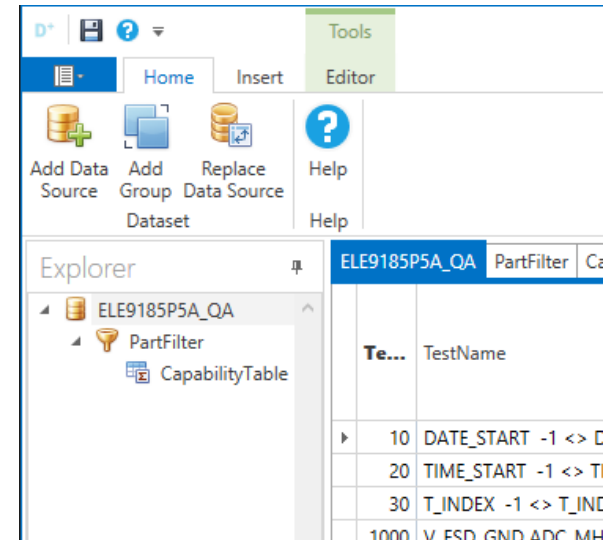
- Easy to learn, intuitive
- Structure and dataflow are clear at a glance
- Fewer clicks, less dialogs

The screenshot displays the software's user interface. At the top, there is a 'Tools' menu with options for 'Home', 'Insert', and 'Editor'. Below this is a ribbon containing various analysis tools categorized into 'Filters', 'Tables', and 'Charts'. The 'Tables' section includes 'Capability Table', 'Repeatability Table', 'Reproducibility Table', and 'ANOVA Table'. The 'Charts' section includes 'Trend Chart', 'Histogram Chart', 'Probability Chart', 'Pareto Chart', 'Bin Map', 'Parametric Map', 'Scatter Chart', 'Delta Chart', and 'Box Chart'. The main workspace shows an 'Explorer' pane on the left with a tree view containing 'ELE9185P5A_QA', 'PartFilter', and 'CapabilityTable'. The main area displays a data table with the following content:

Te...	TestName	SeqName	LimitLow	LimitHigh	Unit	Fz
10	DATE_START -1 <> DATE_START	DATE_START			yymmdd	
20	TIME_START -1 <> TIME_START	TIME_START			hhmmss	
30	T_INDEX -1 <> T_INDEX	T_INDEX	0	1023	s	
1000	V_ESD_GND ADC_MH0 <> V_ESD_GND	V_ESD_GND	-1	-0.2	V	
1001	V_ESD_GND ADC_MH1 <> V_ESD_GND	V_ESD_GND	-1	-0.2	V	
1002	V_ESD_GND ADC_ML0 <> V_ESD_GND	V_ESD_GND	-1	-0.2	V	
1003	V_ESD_GND ADC_ML1 <> V_ESD_GND	V_ESD_GND	-1	-0.2	V	
1004	V_ESD_GND COMPCCLK_N 13.c5 <> V_ES...	V_ESD_GND	-1	-0.2	V	

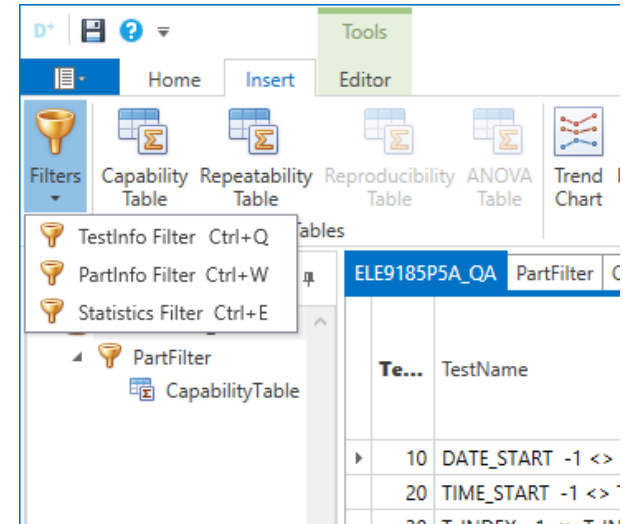
Easy loading of Datasets

- Load datasets
 - ▶ STDF v4
 - ▶ CSV
 - ▶ Customer specific
- Group datasets to compare



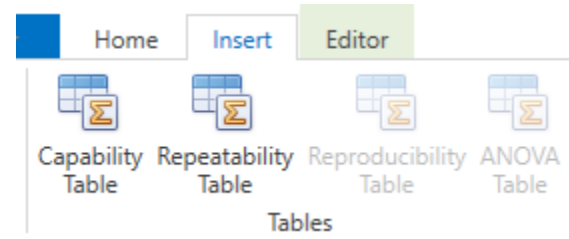
Easy filtering to be able to focus

- Filter your data on tests, parts, sites or more complex expressions.
- Filtered output can be input to charts or statistics analysis.



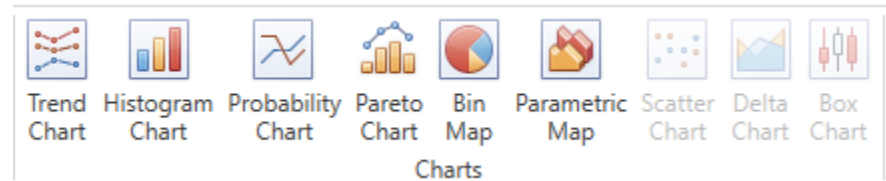
Tables to quickly sort main topics

- **Statistic evaluation of your test data**
 - ▶ Capability table
 - ▶ Repeatability table
 - ▶ Reproducibility table
 - ▶ GRR
- **Optionally filtered**



Charts to quickly see where to focus

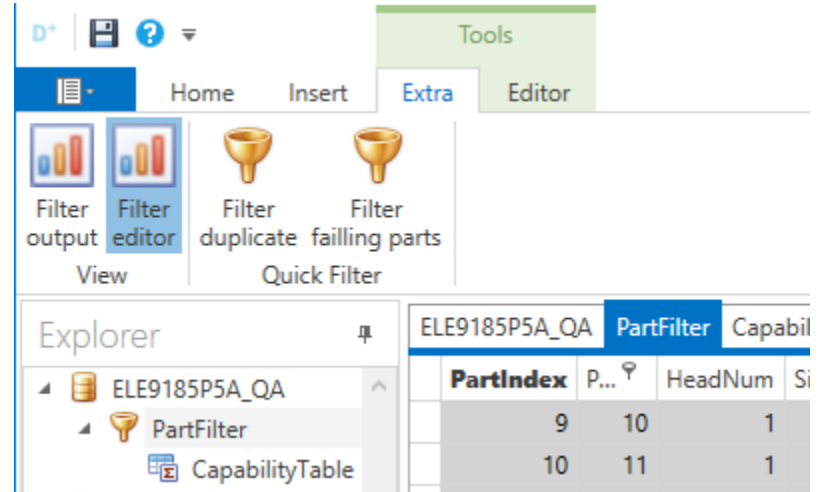
- Visualize selected aspects of your test data
 - ▶ Trend charts
 - ▶ Bar charts
 - ▶ Wafer maps
 - ▶ 3D charts
 - ▶ Box plots



- Optionally filtered

Context driven ribbon

- Special menus appear when working with charts, tables or limits.



The screenshot displays a software interface with a ribbon menu. The ribbon has tabs for Home, Insert, Extra, and Editor. The Extra tab is active, showing options like Filter output, Filter editor, Filter duplicate, and Filter failing parts. Below the ribbon is an Explorer pane showing a tree view with folders like ELE9185P5A_QA and sub-items like PartFilter and CapabilityTable. To the right is a data table with columns PartIndex, P..., HeadNum, and Si.

PartIndex	P...	HeadNum	Si
9	10	1	
10	11	1	

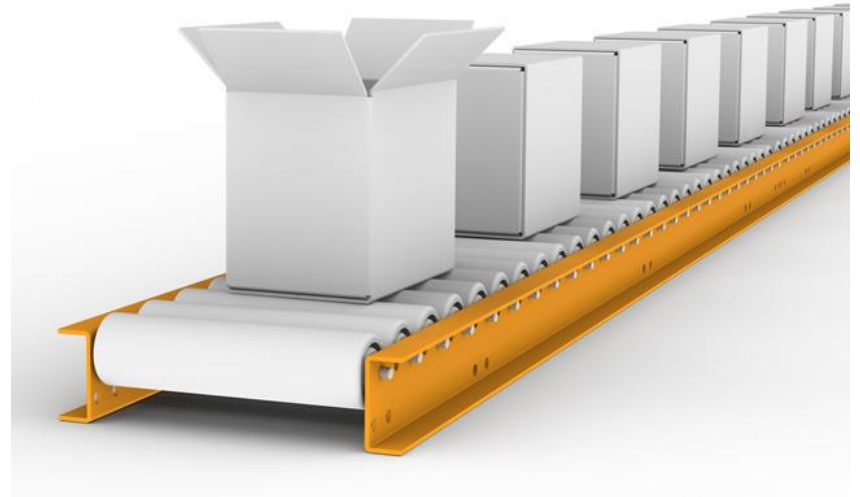
Licensing concept

- Annual user license
- Free updates with a valid subscription



Release schedule

- Q1 2020 DPlus v1.0
- Q2 2020 DPlus v1.1
 - ▶ Additional features
- Q3 2020 DPlus v1.2
- Half year feature releases



- Salland is looking for volunteers to test the first version (Beta test)

Customer requests

- **Customer features requests**
 - ▶ Feasibility will be evaluated by Salland
 - ▶ When granted the feature will be planned for the next release.
 - ▶ Any change will be made available to all users



Planned features

- STDF export (v1.1)
- Limit “retry”/Virtual Retest
- Generic 3D chart
- More readers (customer driven)
- Automated tips (problem detection)
- Basic reporting

This is not vaporware

Demo GRR

- Load 4 files
- Add to group
- Add GRR table



Kan je nog iets laten zien van
- Site to Site
- Prepared WorkFlow

More demo's / Q&A during network event at Salland

Thank you!



Contact us



Boerendanserdijk 39
8024 AE Zwolle
The Netherlands



<https://www.salland.com>



sales@salland.com



<https://www.linkedin.com/company/salland-engineering>