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GLASTEST

Universal Interface Test Management for EG2001

Brice Blanc

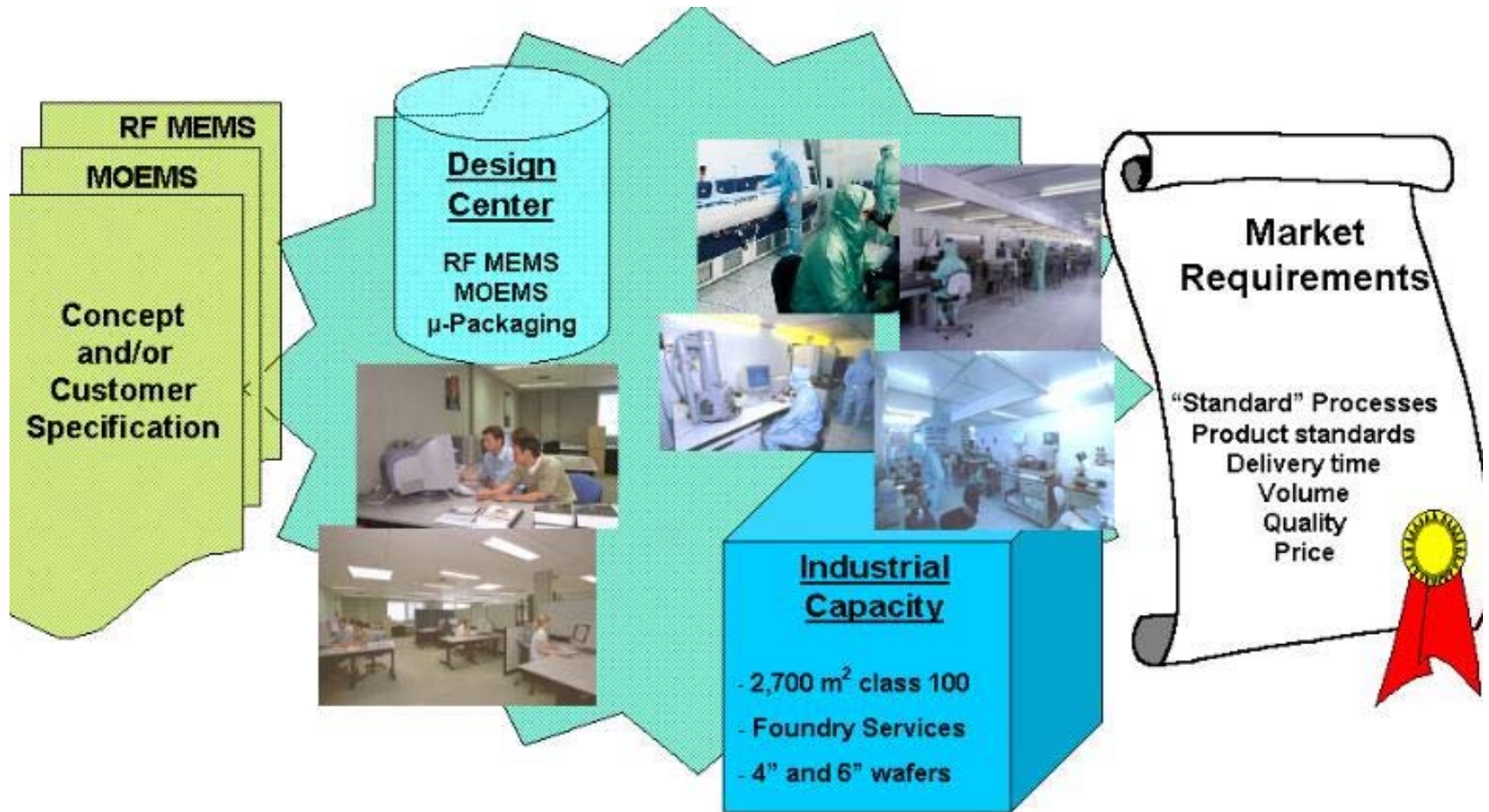
Philippe Sandri

*South West Test Workshop
9-12 June 2002
Long Beach, CA USA*

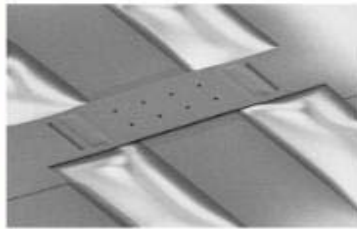
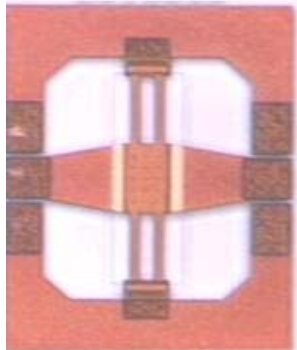
June 2002



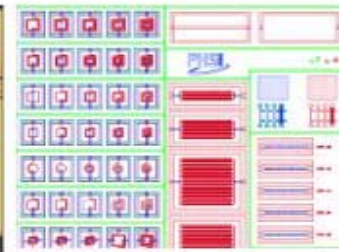
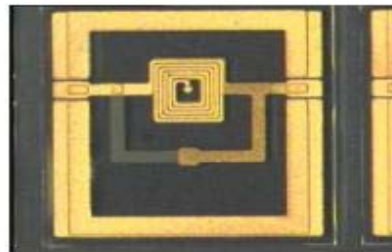
- Introduction
 - PHS MEMS activity
 - What is expected from a prober interface
- GlasTest presentation
 - Configuration
 - Probe card management
 - Accuracy & quality approach
 - Wafer map
 - Engineering functions
- Conclusion



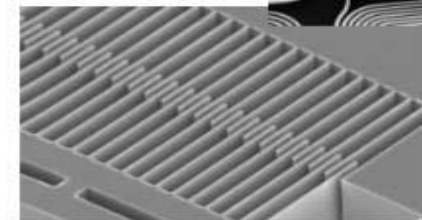
PHS MEMS Technologies



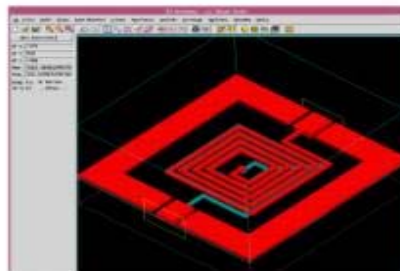
Metallic Membranes



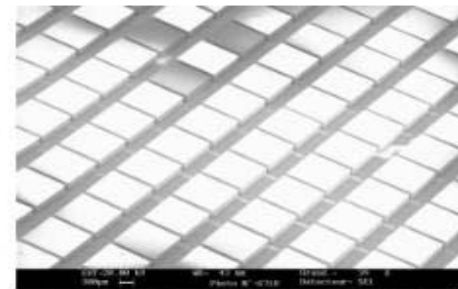
Hi-Q Inductors, Integrated Passives, Antennas



Electrostatic and Electromagnetic Actuators



3D Electromagnetic Simulation



Wafer Level Packaging

PHS MEMS have a large variety of devices to test, the ability of a system to accommodate was the motor of our investigation.



One cost effective solution is to extend the testing life of EG 2001 prober.

What is the premier objective when running a test sequence ?

- Accuracy
- Productivity
- Probe card management
- Access to your data
- Engineering use

GlasTest introduction

GlasTest is a user friendly interface added to existing EG2001 wafer prober.

Adapted for production and engineering,
GlasTest control the wafer prober and instruments via
the GPIB interface.

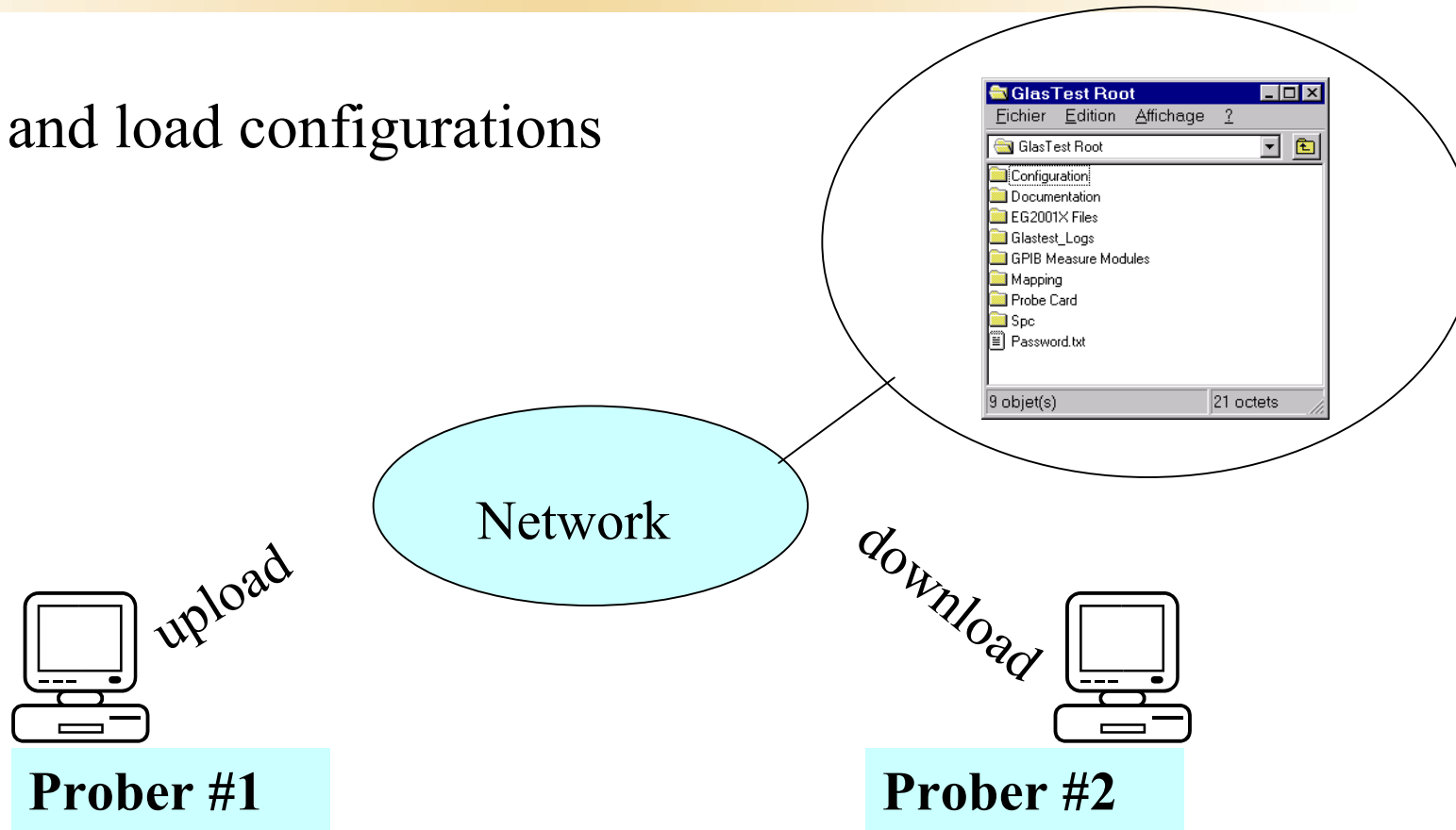
Developed under LabVIEW environment, it is quickly
installed on a personal computer running windows NT.

Main menu



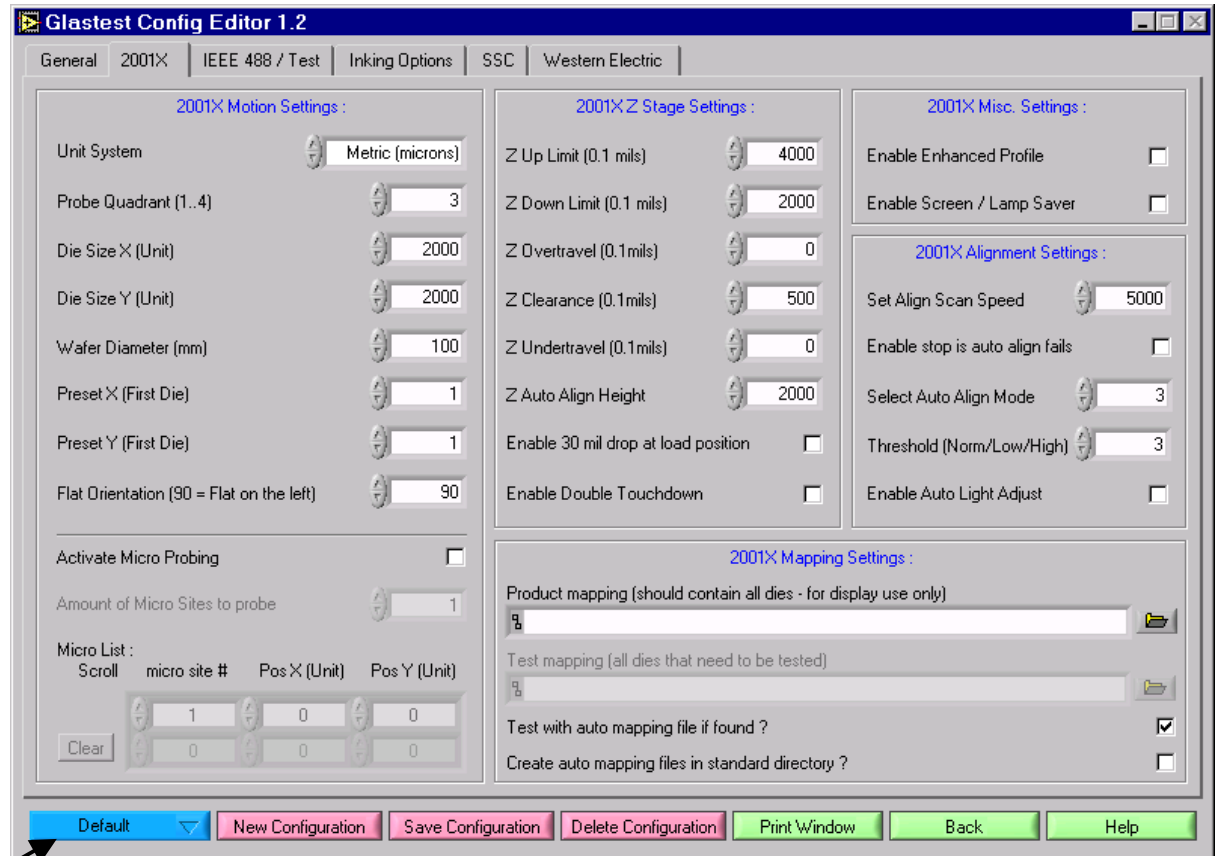
Access to different level secure by password

Save and load configurations



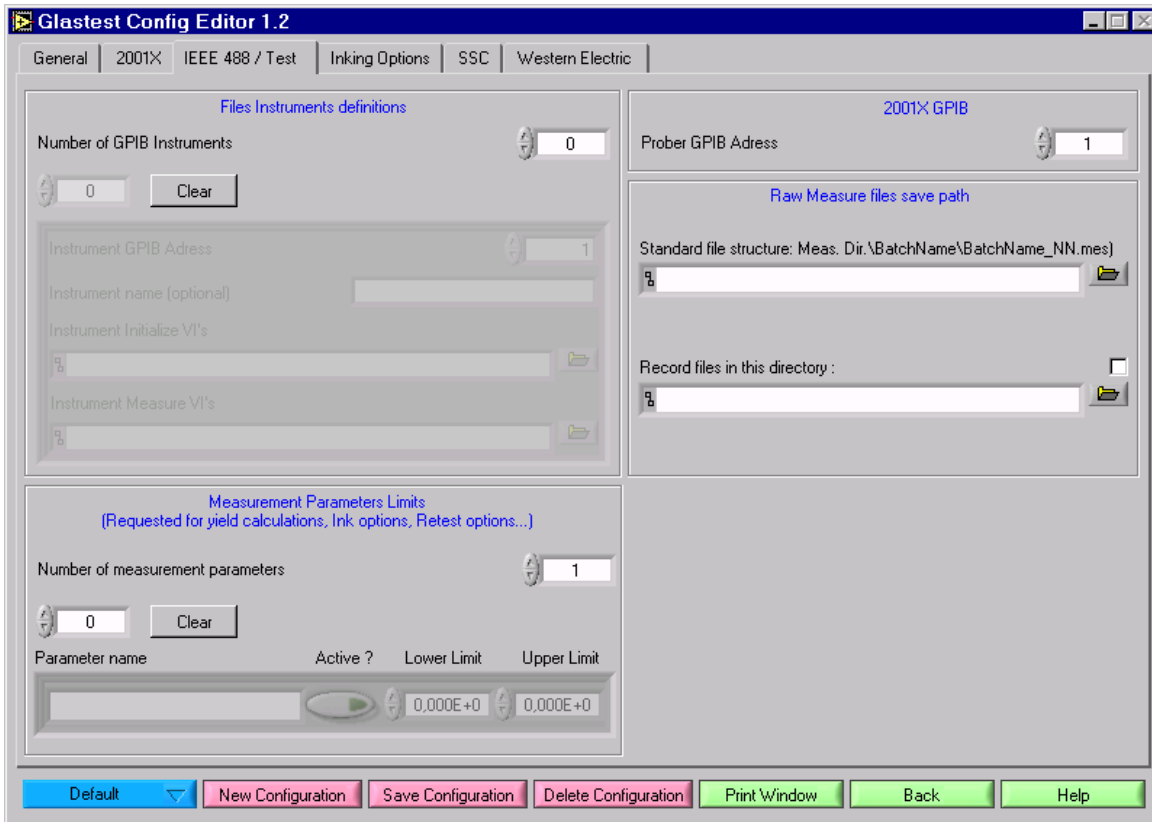
Physical configuration

Physical configuration where all parameters are recorded for all set up. (eg : die size, wafer diameter, first die, micro-probing...)



Config.
selector

Tester interface



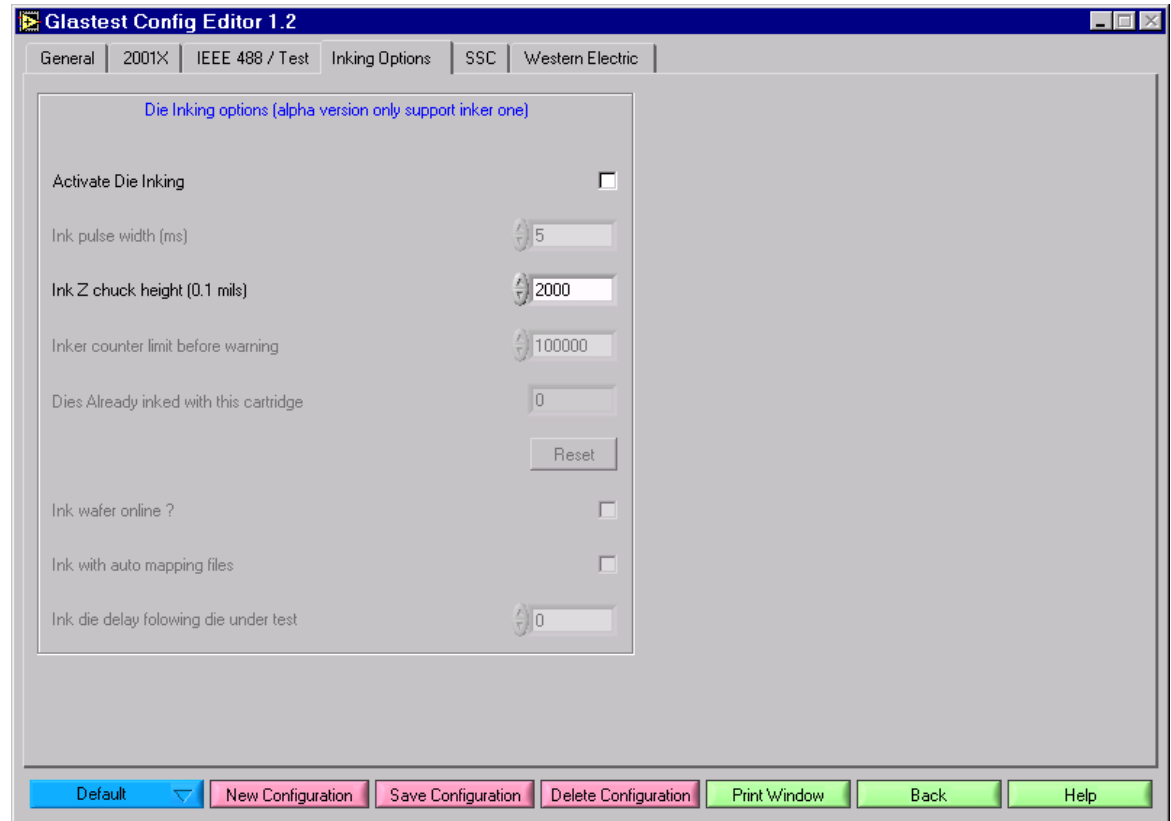
Network path declaration to recover recorded files.

Up to 30 instruments can be connected via GPIB bus.

Inker options

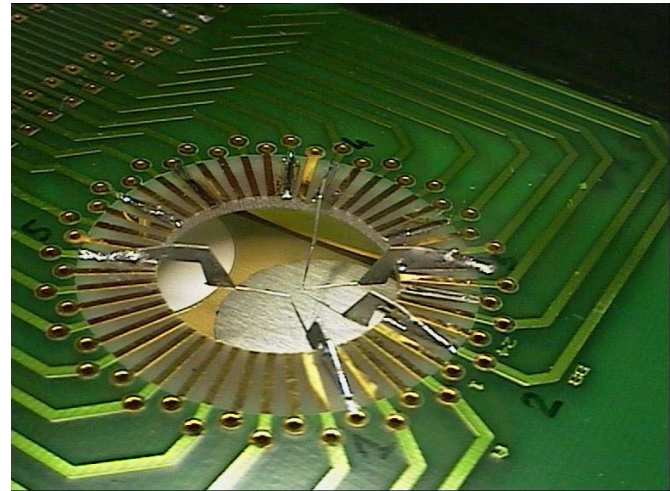
Inline or offline inking.

Limits are specified in the test interface menu. (multi-parameters combinations).

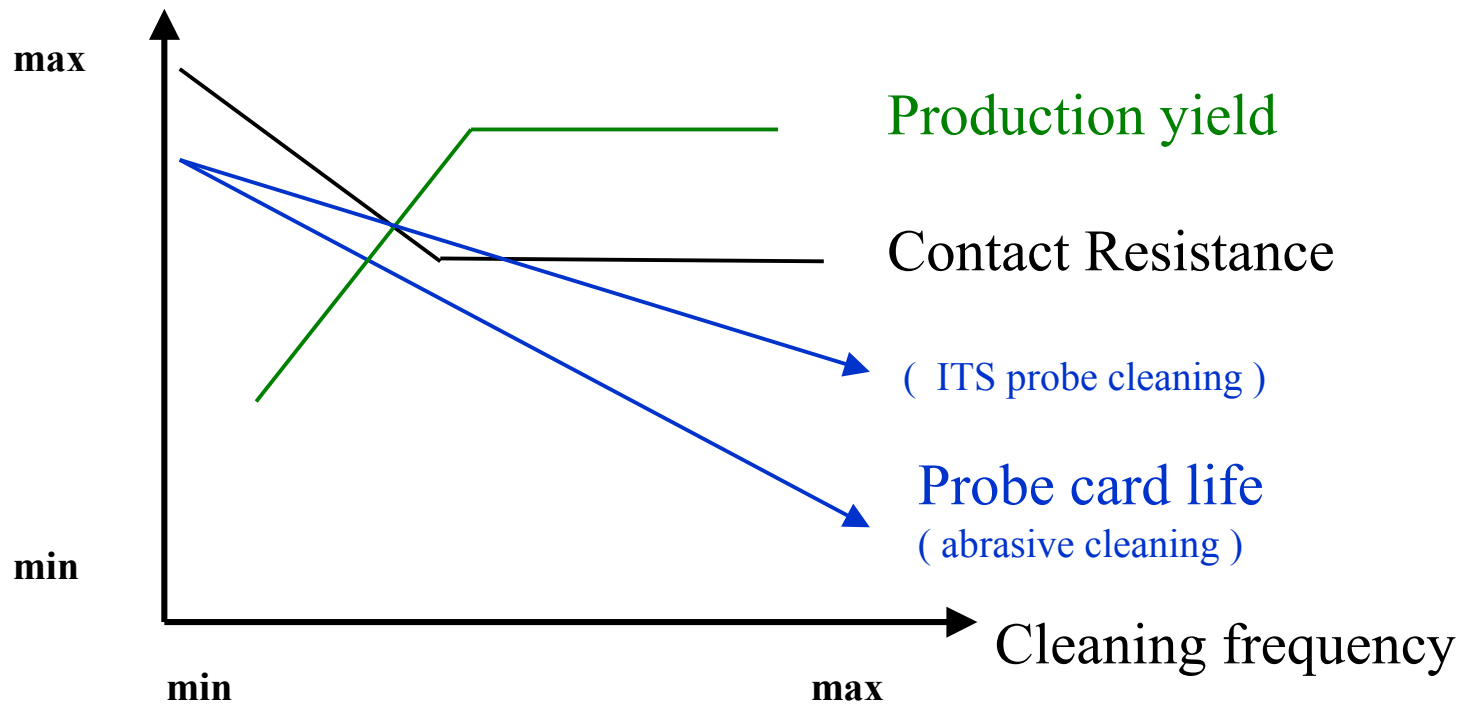


Probe card management

- Cleaning rate optimization :
 - maximize yield
 - minimize cost
- Cost identified
 - capital
 - labor
 - throughput
 - maintenance



- Cleaning frequency influence



Too much cleaning increase production costs

Not enough cleaning affects yield

Find your optimum cleaning rate,

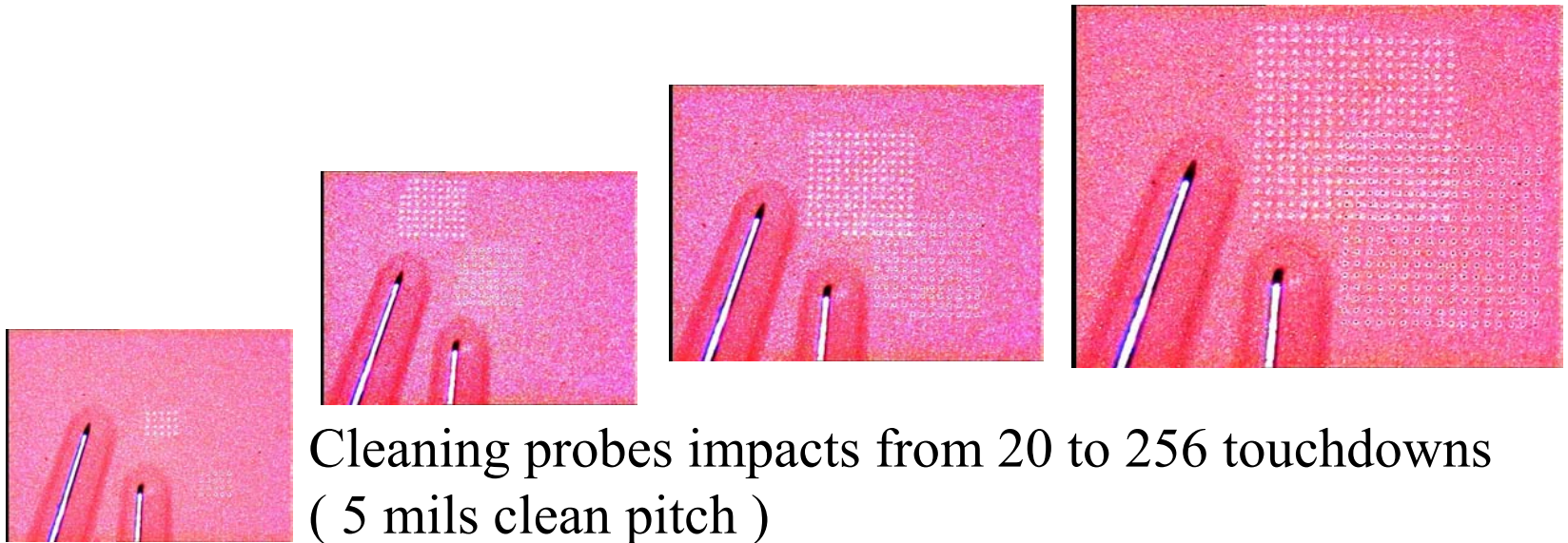
Prober Statistic Stability Control can help.

Yield impact is defined as classifying a bad die when it is good.

Cleaning routine

Cleaning pad surface is declared from edge declaration, cleaning routine matches whatever the dimension or the location.

Specific algorithm for ITS cleaning products.



Cleaning probes impacts from 20 to 256 touchdowns
(5 mils clean pitch)

Separate data files are created for each probe card :

- #Touchdowns
- #Clean operations
- Clean pitch
- Cleaning frequency/mode
- Maintenance frequency
- First installation date
- EG identity listing

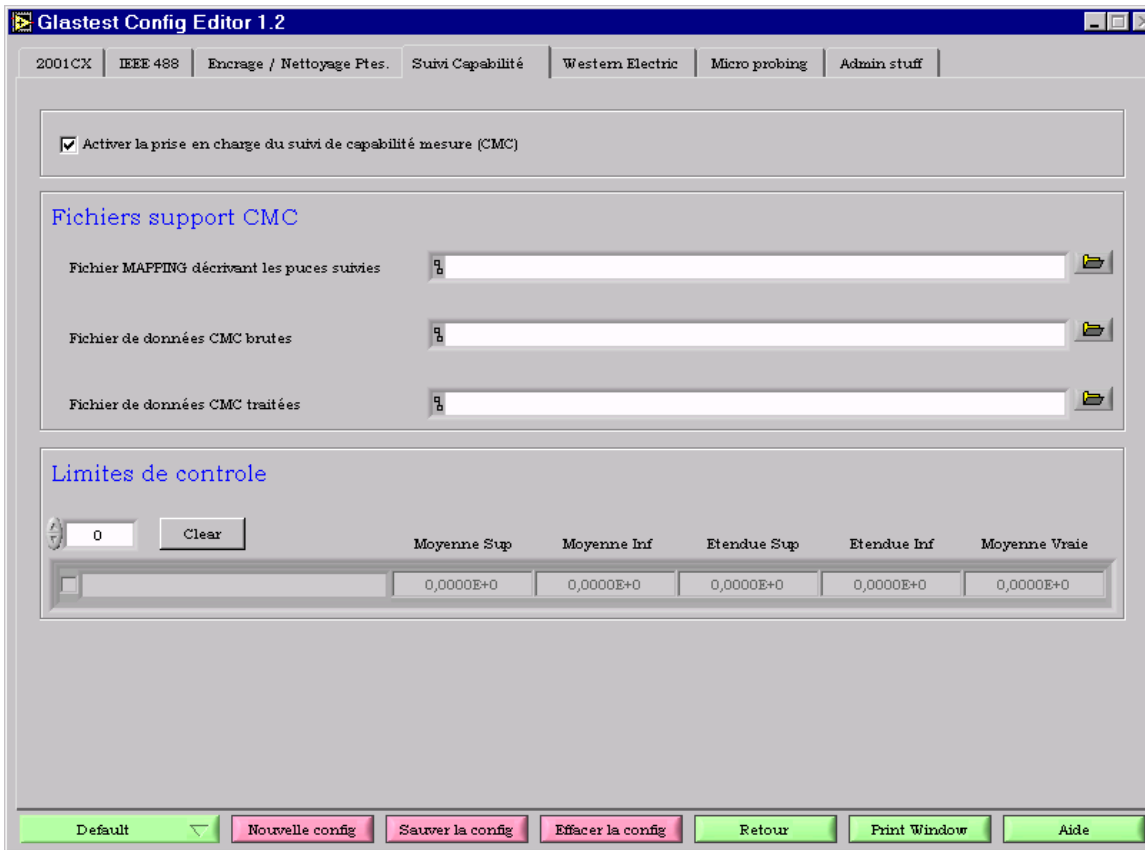
- Repeatability and reproducibility gage study perform for multi parameter applications.
- Measurement capability
 - $C = \text{Tolerances} / \text{Dispersion}$

Working standard generation, upper and lower limits calculation with SPC methodology.

Control charts are followed with an adjustable frequency

Parametric Western Electric alarm rules

Stability control



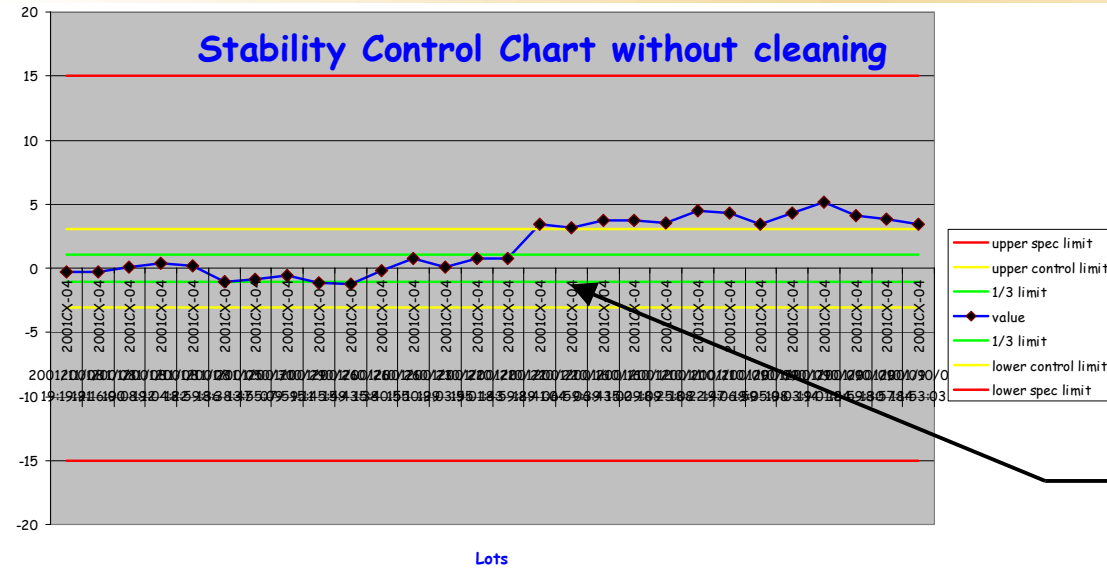
Configure
reference data
and declare
upper and
lower control
limits

Working standard results

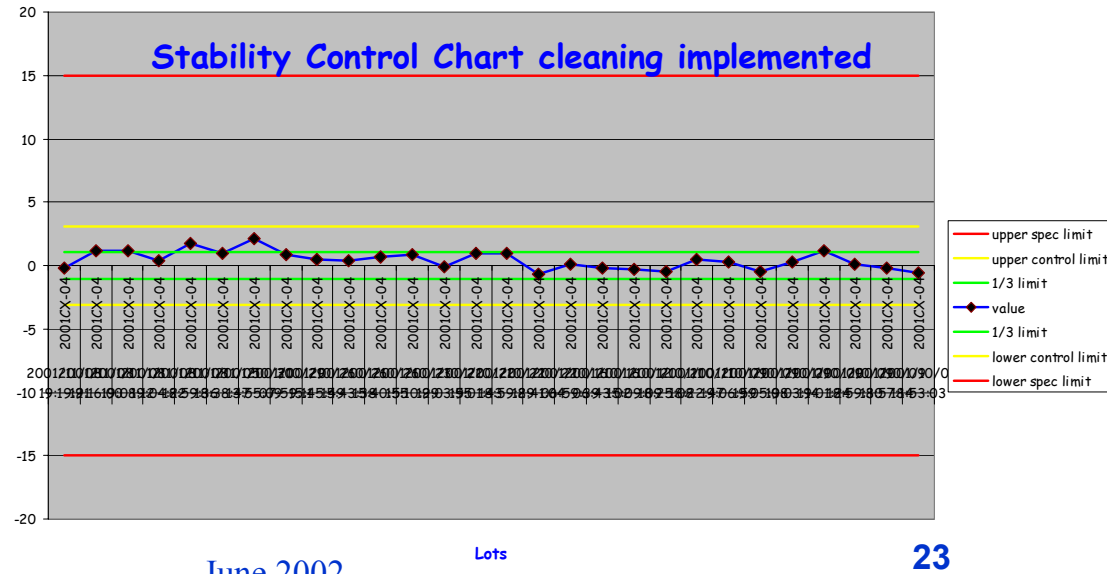
Operator is immediately advise of the prober accuracy after the working standard measurement.



Control charts visualization



Number of touchdowns optimization

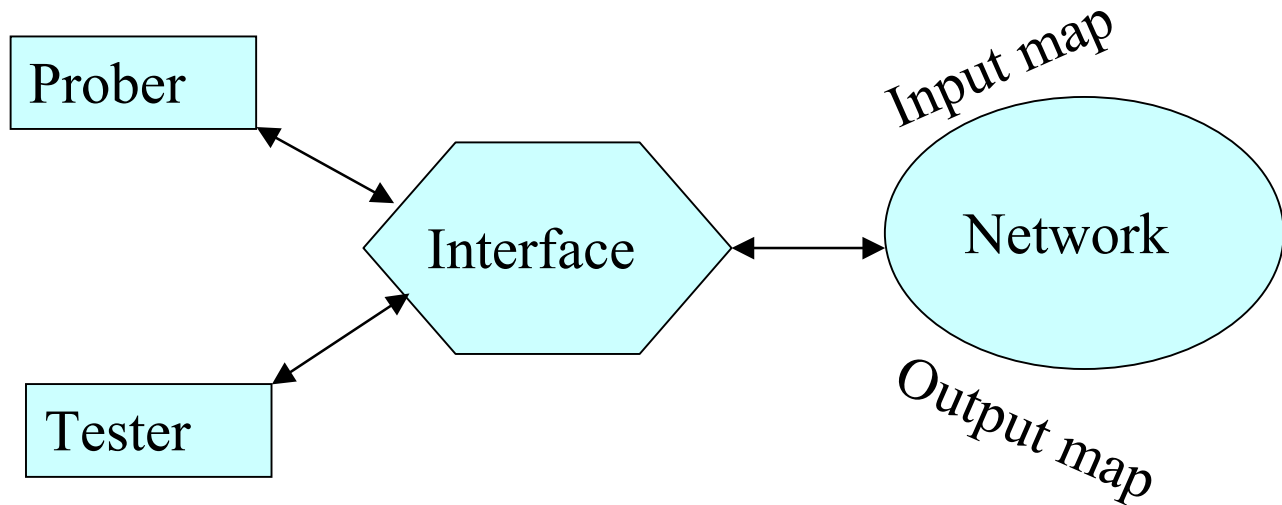


Probe card cleaning implementation



Wafer map

- In line and final test perform only on selected dies.



Real time wafer status

The screenshot displays the 'Glasstest v1.1' software interface. The main window shows a circular wafer map with colored squares representing different chip statuses: grey (produced), blue (to be tested), green (good), red (out of spec), and yellow (in test). The interface includes several control panels:

- Position:** X: 18, Y: 15
- Etat d'avancement:** Pucés sur plaque: 1778, Pucés à tester: 100, Testées: 36 (with a progress bar at 36%)
- Rendement (%):** 57
- MicroSite:** 1
- Execution:** Temps / plaque (s): 3, Temps / puce (ms): 63
- Mesure:** 5,738849E-3, Puce ok? (red indicator), Limite basse: 0,00E+0, Limite haute: 7,50E-1
- Légende:** Pucés produit (grey), Pucés à tester (blue), Pucés bonnes (green), Pucés Hors spec (red), Puce en test (yellow)
- Buttons:** Executer Mesure, Enregistrer Mesure, Go to position, Levé / Baisé (Chuck), Lampe, Terminer les mesures, ARRET URGENCE

From sort to packaging :

- Testing
- Dicing
- Inspection
- Pick & place
- Assembly
- Functional test

The problem : wafer map converters

Map file format is adapted to the following steps
in the flow.

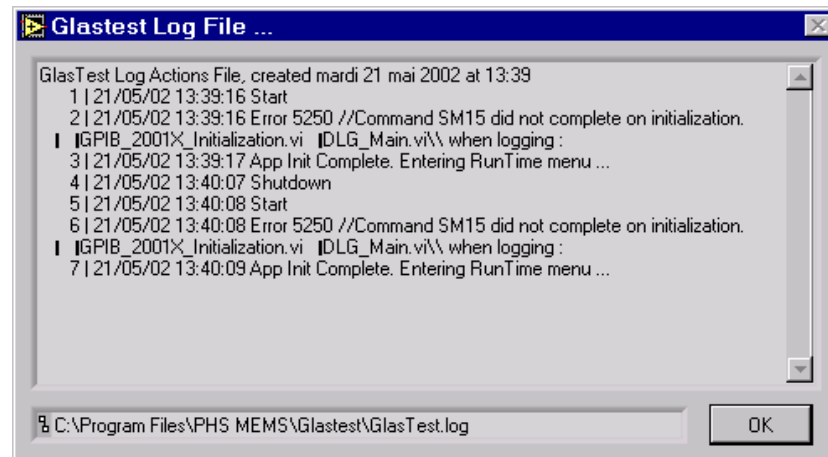
Feedback for maintaining process under control

Die functionality

Yield enhancement

Virtual mode allows test engineers to verify the set up, and instruments test's routines without being connected to a prober.

Log viewer.



Remote test screen monitoring via internet browser.

Operation menu

Production screen as clear as possible for operating.

Glastest 1.2 Login informations...

Last name: Sandri
First name: Philippe
Employe number: 1033
No de Lot: W458

mardi 21 mai 2002 14:09:05

Stability Control

Select all 25 wafers

Select wafers to test:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Comments: Test Wafer 1, 4 and 9 ...

Cancel Next

GlasTest has multiple Economic and Technical Advantages

Flexible

Accommodates a large variety of devices.

Stand Alone or network management system.

GlasTest provides development and production support.

Accurate

all quality requirements : Stability Control Chart & SPC.

working in a Know Good Die environment.

cleaning probe card routine control.

Revenue increase

increase yield, throughput and probe card life

Conclusion

For more information's please address any questions to :

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b.blanc@phsmems.com