IEEE SW Test Workshop

Semiconductor Wafer Test Workshop

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The UltraSound CLEANER™

« A nondestructive cleaning solution for PC, optimizing test floor yield and COO »

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The UltraSound CLEANER™

« A nondestructive cleaning solution for PC, optimizing test floor yield and COO »

- ✓ ***Introduction and background***
- ✓ ***Objectives and goals***
- ✓ ***1st Process samples before-after***
- ✓ ***Relevant findings, results and key data***
- ✓ ***3 years real production data***
- ✓ ***Summary and conclusion***
- ✓ ***SWTW questions***

Project partners

✓ **ST Rousset EWS** – EWS Production – **1st Prototype**
Jean-Pierre Rabouin/Robert Diperi/Didier Baumann

✓ **ST Grenoble EWS Technology Center** – R&D – **USC1**
Pierre Ballet

✓ **ST FEM EWS Europe** – Pre project
Géraldine Thiery

✓ **CEPRIM TECHNOLOGIES** – Project owner
Roland Boyer

✓ **GLOBAL TECHNOLOGIES** – Automation
Franck Pouch

✓ **SEMI CONSULTING** – Sales/Marketing/Service coordinator
Hervé Alle

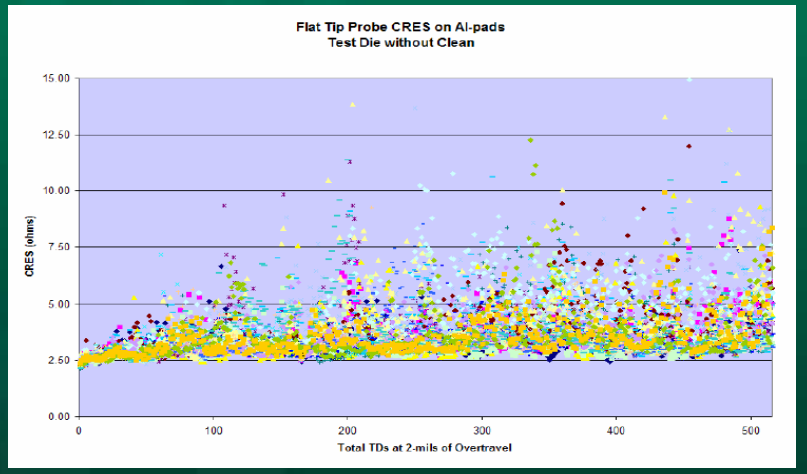
Introduction and background

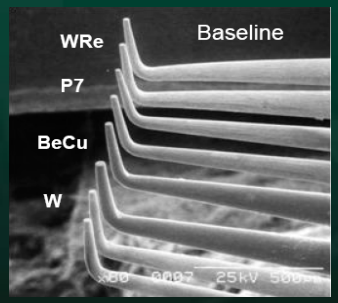
- ***Probe cards technologies is a key factor for end users operation and the cleaning process could have a huge impact on their productivity – Latest technologies are requiring specific cares,***

- ***Existing off-line tools set are either fully manual, chemical dependant, costly and hazardous solutions,***

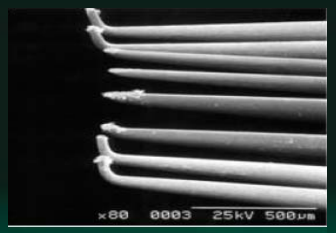
- ***In-line ones are modifying the tips geometry and impacting the contacts resistance (CRES),***

- ***<u>In any case, most standard cleaning solutions are mechanically contacting the probe tips.</u>***





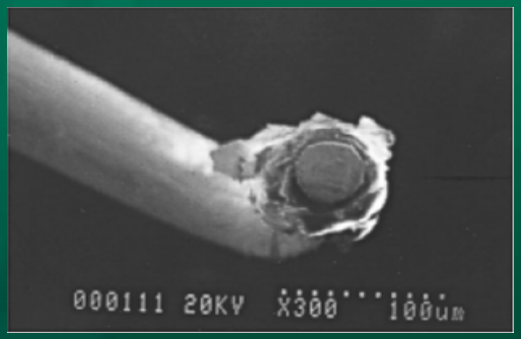
500k TDs
Ceramic Disk

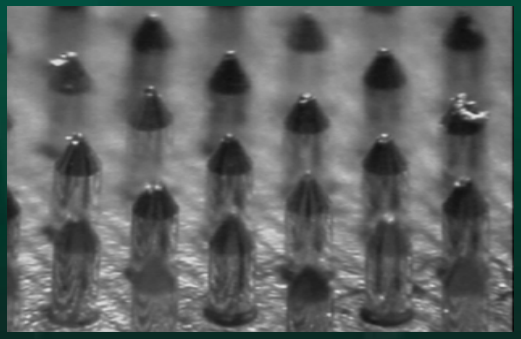


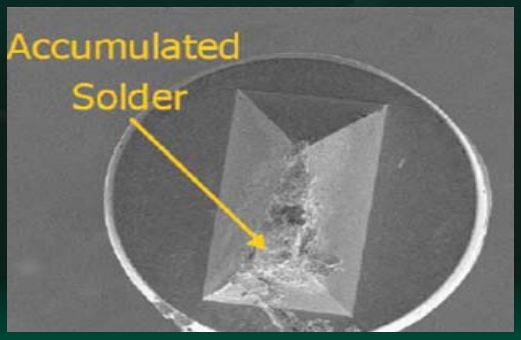
100k TDs
1-µm Lapping Film

Objectives and goals

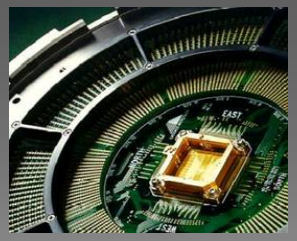
- *"Provide me with an alternative solution that has the fastest, most safely and fully automated process control",*
- *"This industry is requiring a nondestructive solution of cleaning compatible with all types of probe cards without modifying the tips geometry nor impacting the CRES",*
- *"All types of residues should be removed and ideally probe tips should be reshaped with a contactless process",*
- *"I need a duplicable and productive solution of cleaning that avoid manual contact during clean".*

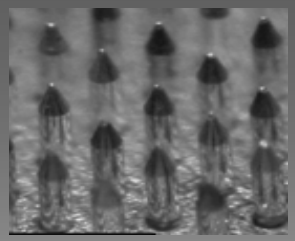


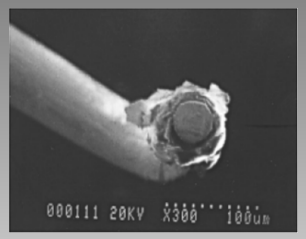


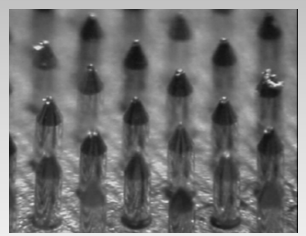


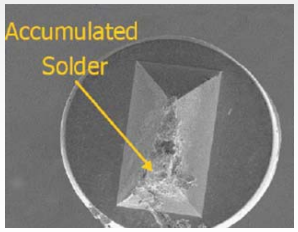
Objectives and goals







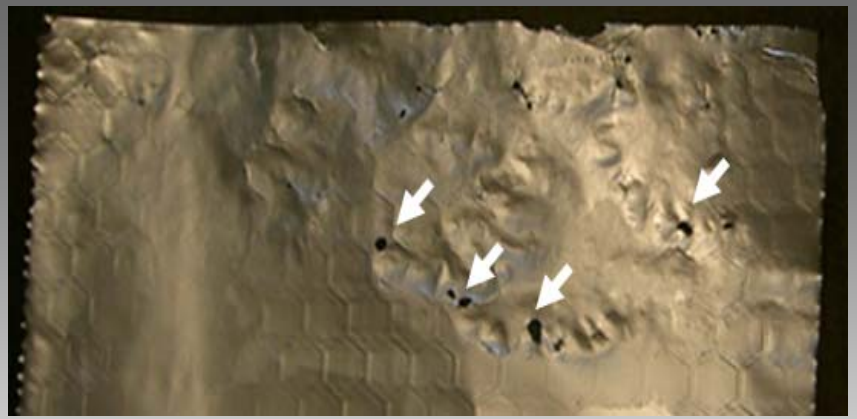




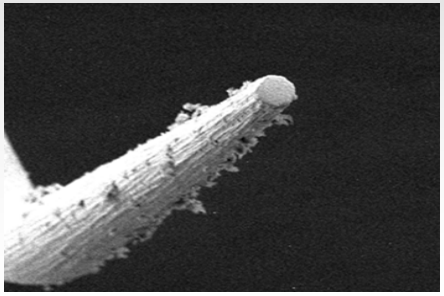
- *Few mins process only*
- *Contactless & non destructive solution*
- *Easy operation*
- *Automated controls*
- *Duplicable process*
- *Cleaner/Reshaper*
- *All probe cards type compatible*
- *Environment free*
- *Fast ROI*

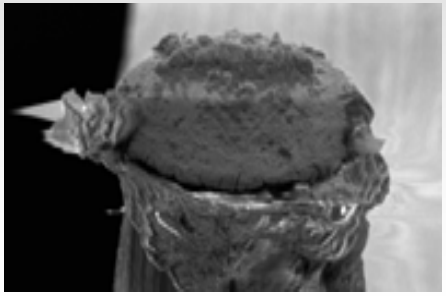
Relevant findings, results and key data

Ultrasounds chemistry – Different materials

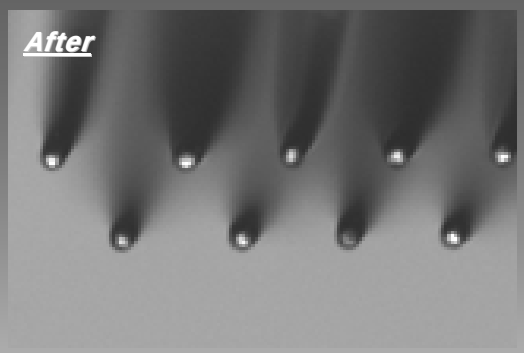


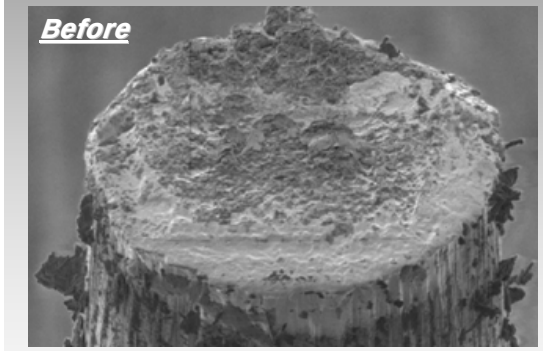
Process set-up – Probe tips re-pointing

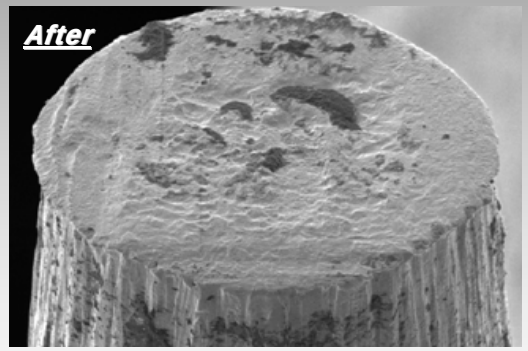


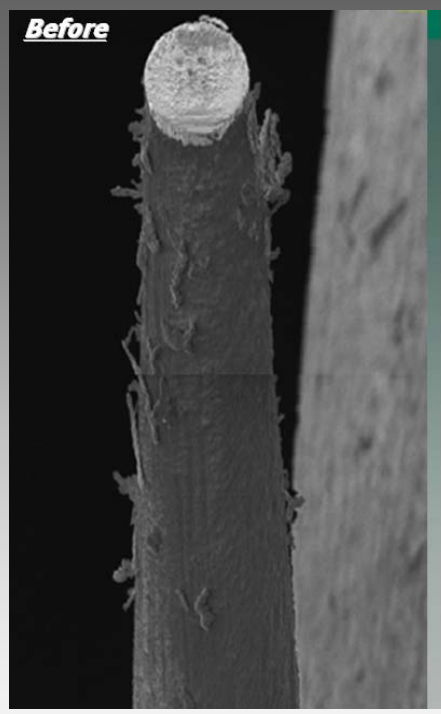


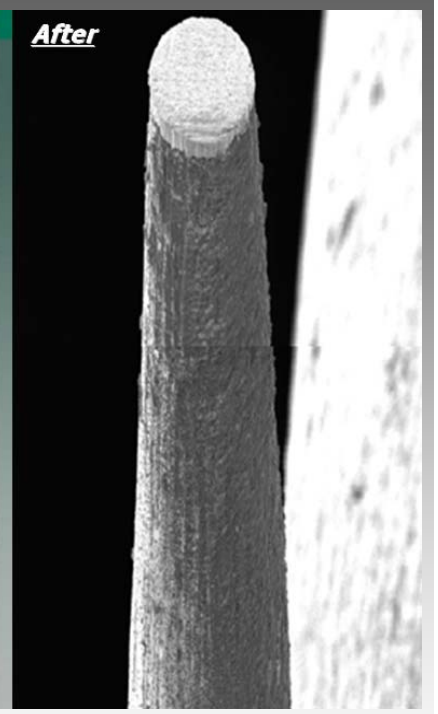
1st Process samples before/after





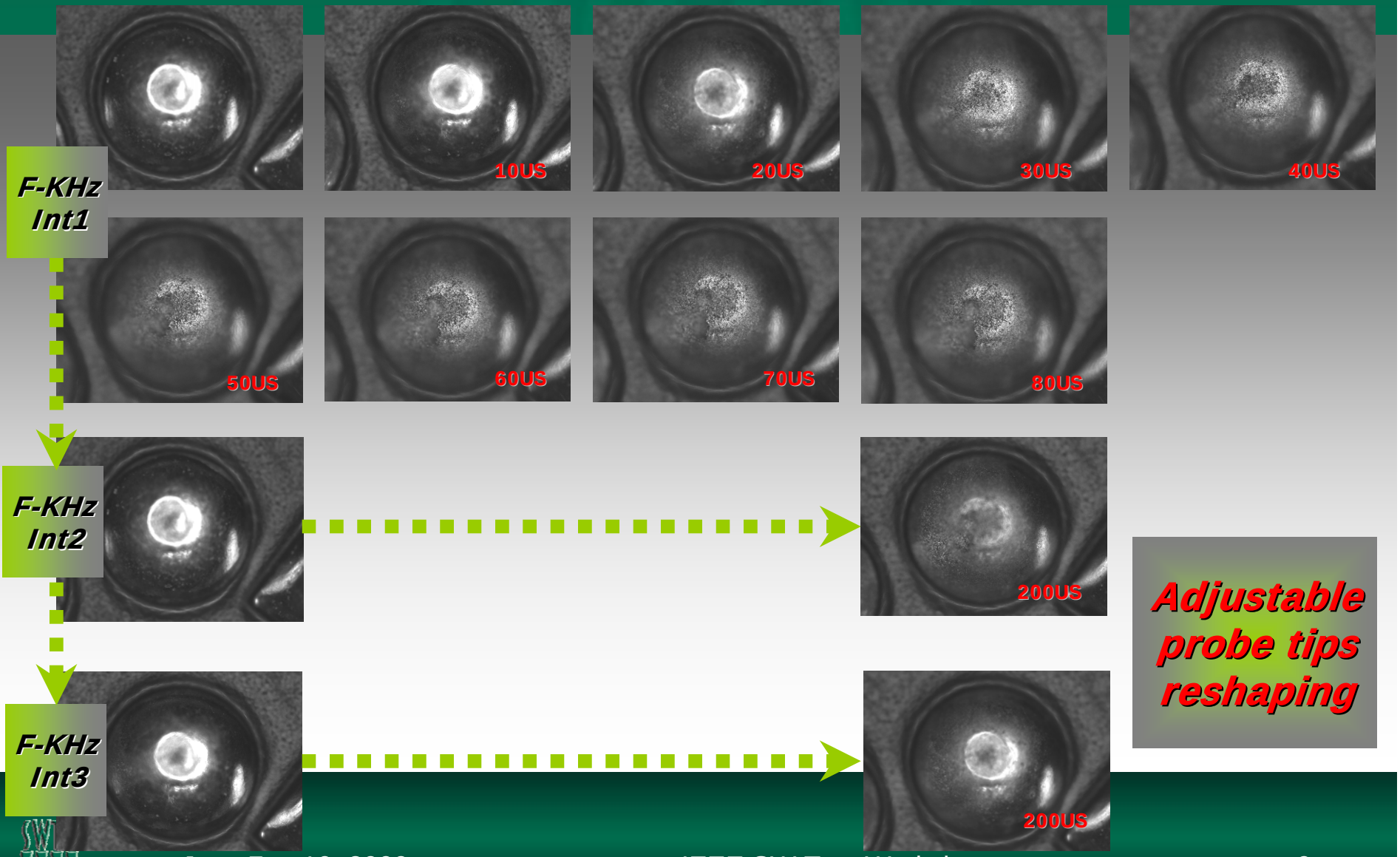






All Probe cards impurities are removed within less than 5 minutes

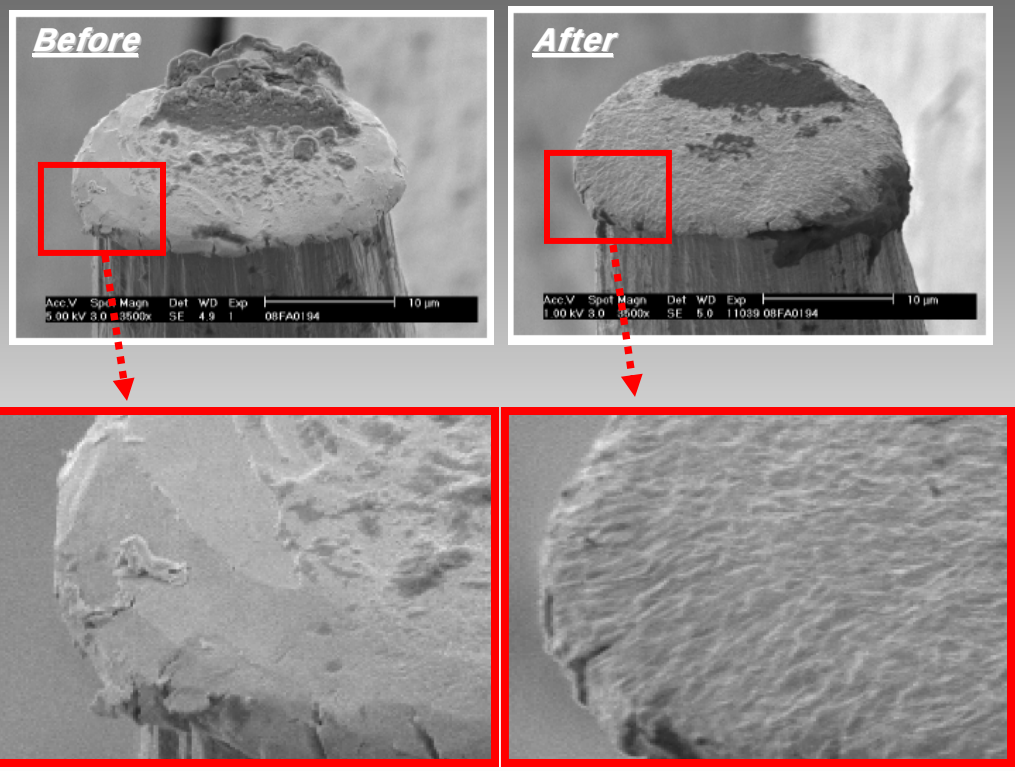
Relevant findings, results and key data



Relevant findings, results and key data

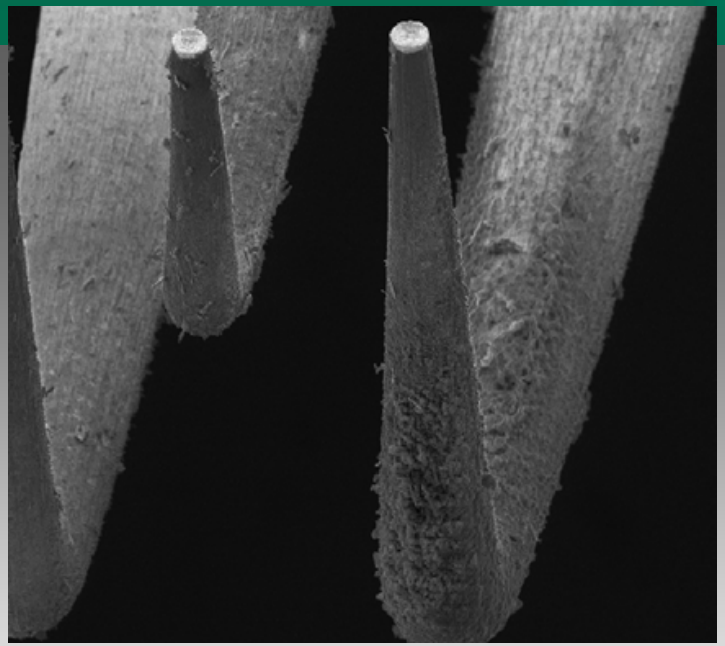
Before/After Scrubbing

Before/After 20 sec. USC1

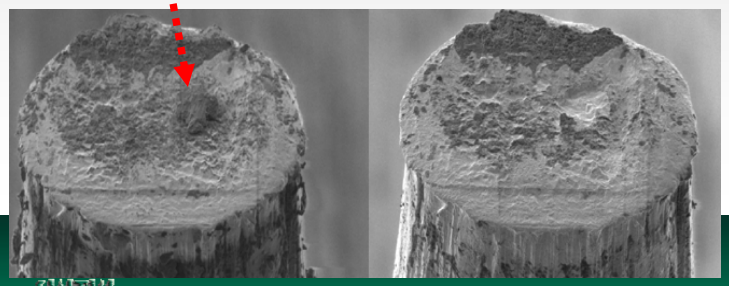


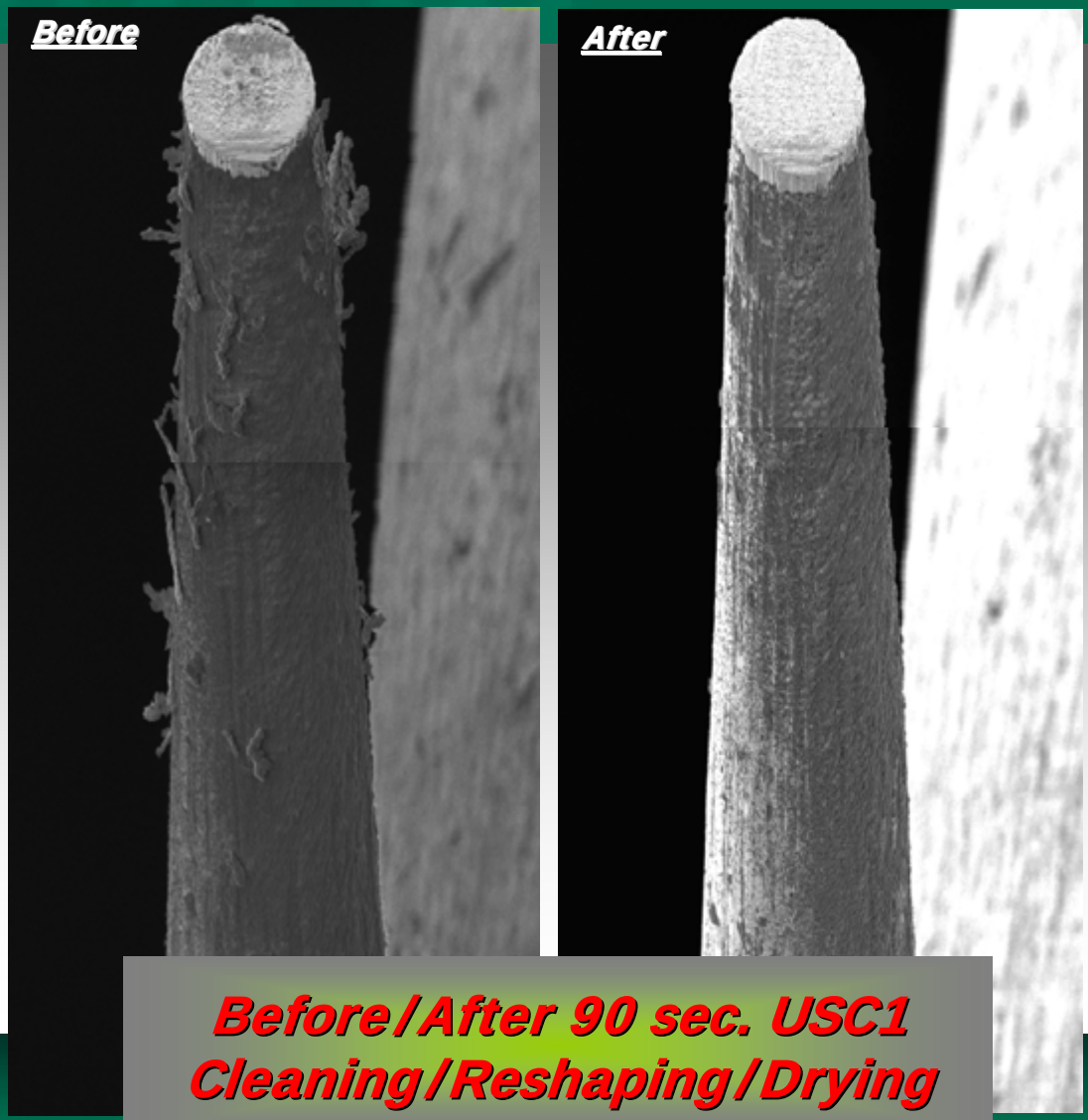
Process set-up
Probe tips reshaping

Relevant findings, results and key data



Even 2µm size particles are removed

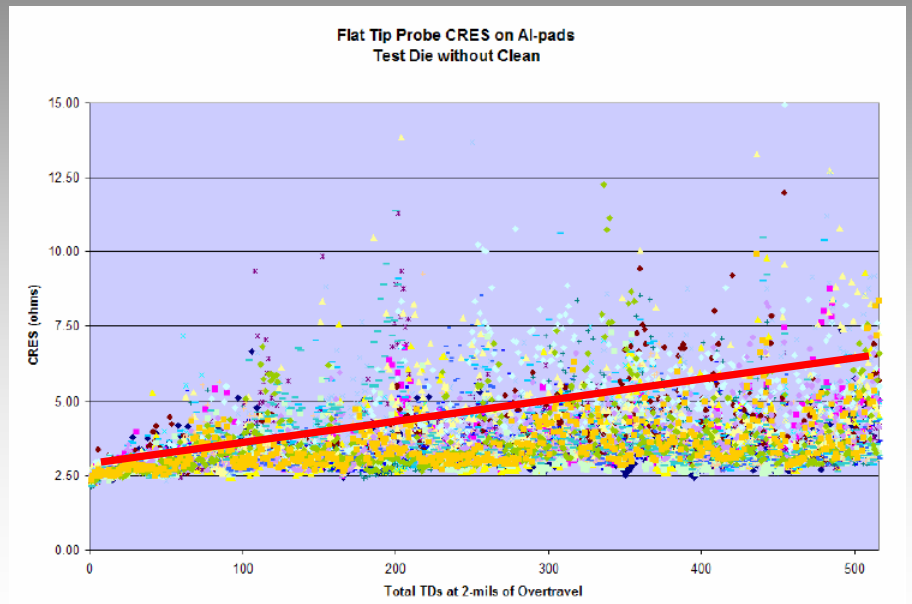


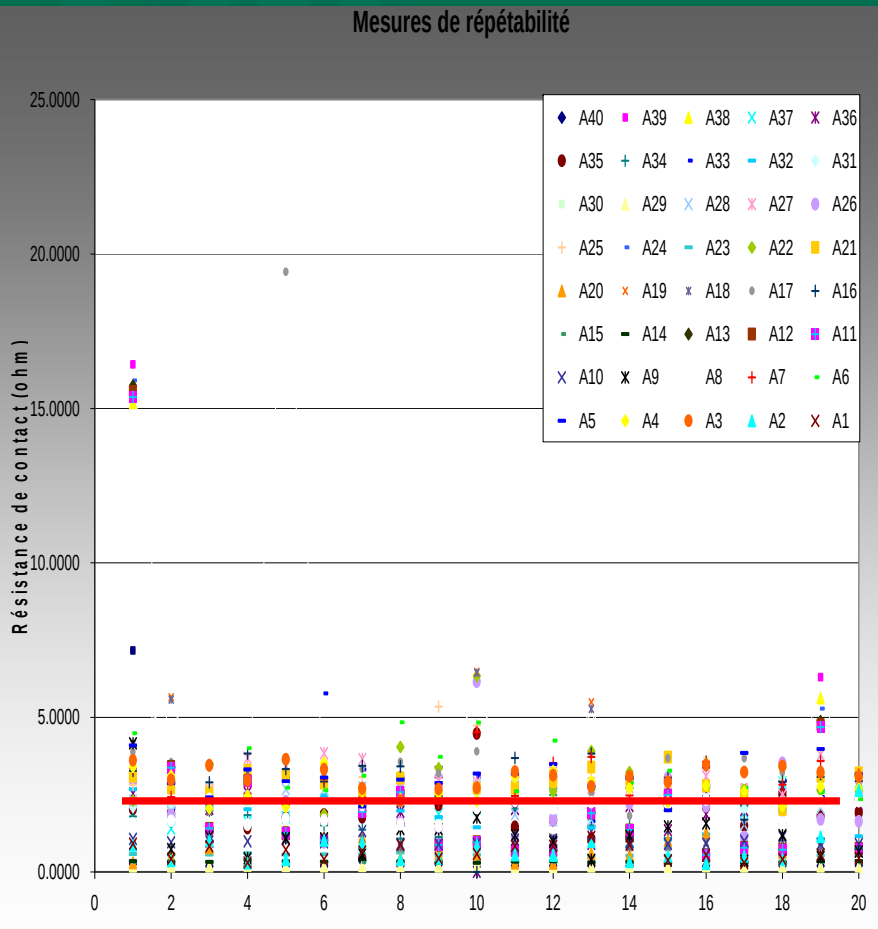


Before/After 90 sec. USC1 Cleaning/Reshaping/Drying

Relevant findings, results and key data

Test die without clean CRES





40 tip probe/100 cleans CRES with USC1

3 years real production data

Summary and conclusion




Preparation for clean
- *probe card*
- *holder*
- *Z work*

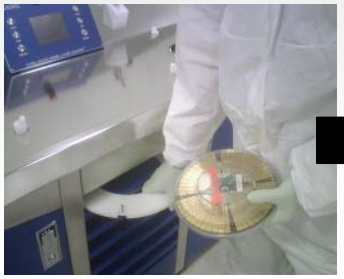


Cleaning step
- *manual start*
- *ultrasound process*
- *adjustable reshape*
- *adjustable timing*




Drying step
- *air spray*
- *manual start*
- *adjustable timing*





Back to production
- *within 5 mins*
- *easy operation*
- *free maintenance*
- *clean room designed*

Summary and conclusion

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- *"This industry is requiring a nondestructive solution of cleaning compatible with all types of probe cards without modifying the tips geometry nor impacting the CRES",*
- *"All types of residues should be removed and ideally probe tips should be reshaped with a contactless process",*
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5 mins total process
Contactless
Non destructive solution
Easy operation
Automated controls
Duplicable process
Cleaner/Reshaper
All probe cards
Environment free
Yield increased
Probe cards COO

$$$
EWS
best ROI

Acknowledgement

Special Thanks to:

- ✓ ***ST Rousset EWS***
- ✓ ***ST Grenoble EWS Technology Center***
- ✓ ***ST FEM EWS Europe***

- ✓ ***CEPRIM TECHNOLOGIES***
- ✓ ***GLOBAL TECHNOLOGIES***
- ✓ ***LEPMI***
- ✓ ***SIMAP***

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Questions?

SemiConsulting
Process Support & Services

Hervé ALLE
Managing Director