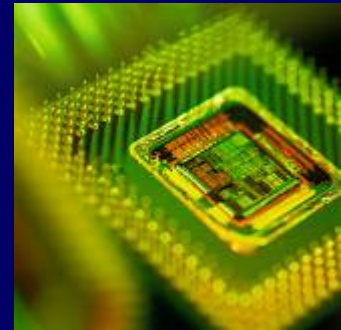


Accelerating Manufacturing Productivity

450mm Transition Update

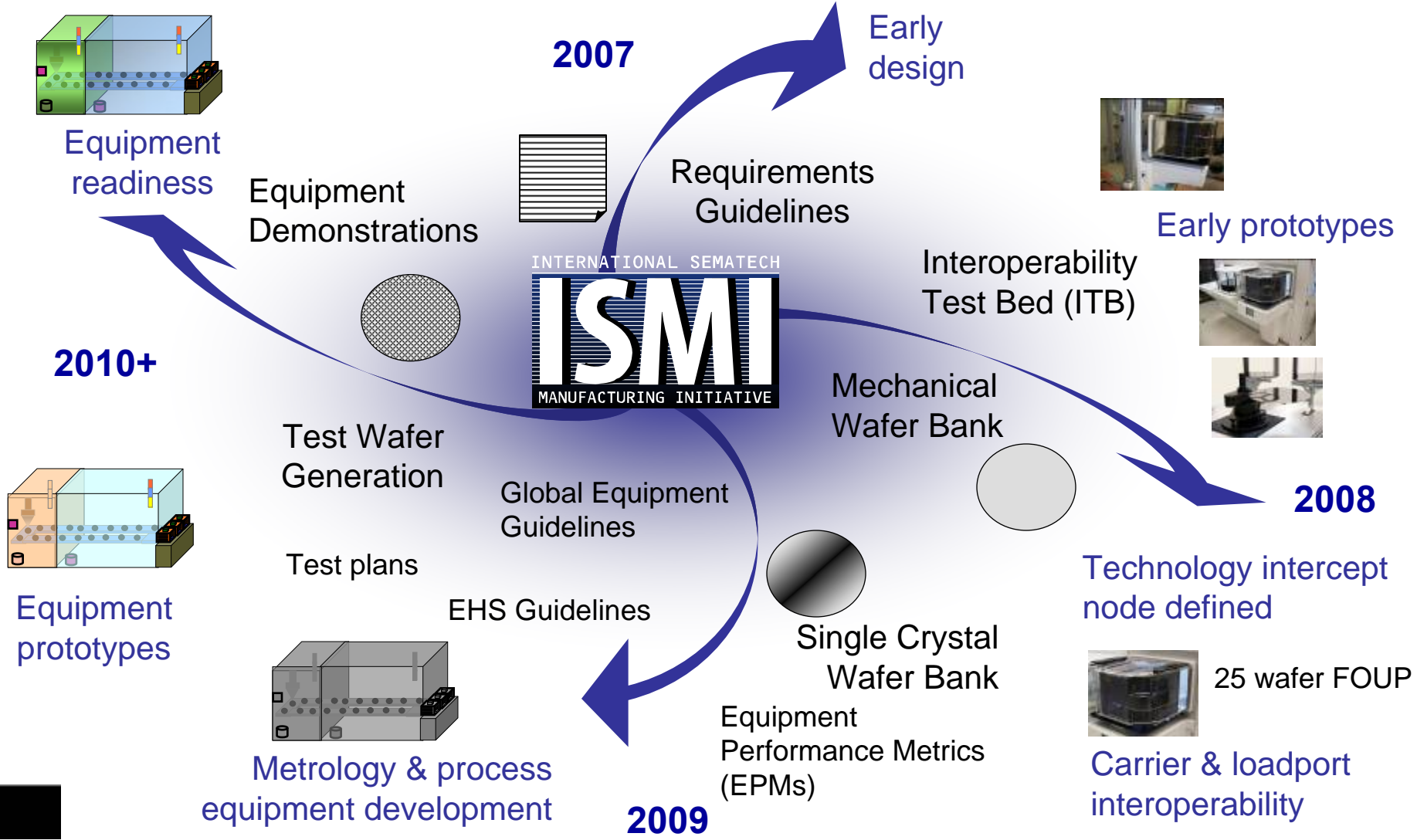
Tom Jefferson
ISMI 450mm Program Manager



Outline

- 450mm Background, Landscape and ISMI 450mm Program Overview
- 450mm Transition Current Status
 - Silicon
 - Equipment
 - Factory Infrastructure
- Summary and Discussion

Coordinating Industry Convergence towards 450mm



450mm: Global Activity



**Funding for ISMI 450mm
Program Announced**



**450mm Standards
initiated - most
finished by 2010**

2006



**European Commission
Funding for 450mm
development**

2008

ITG-J

(Interoperability
Test Group –
Japan)

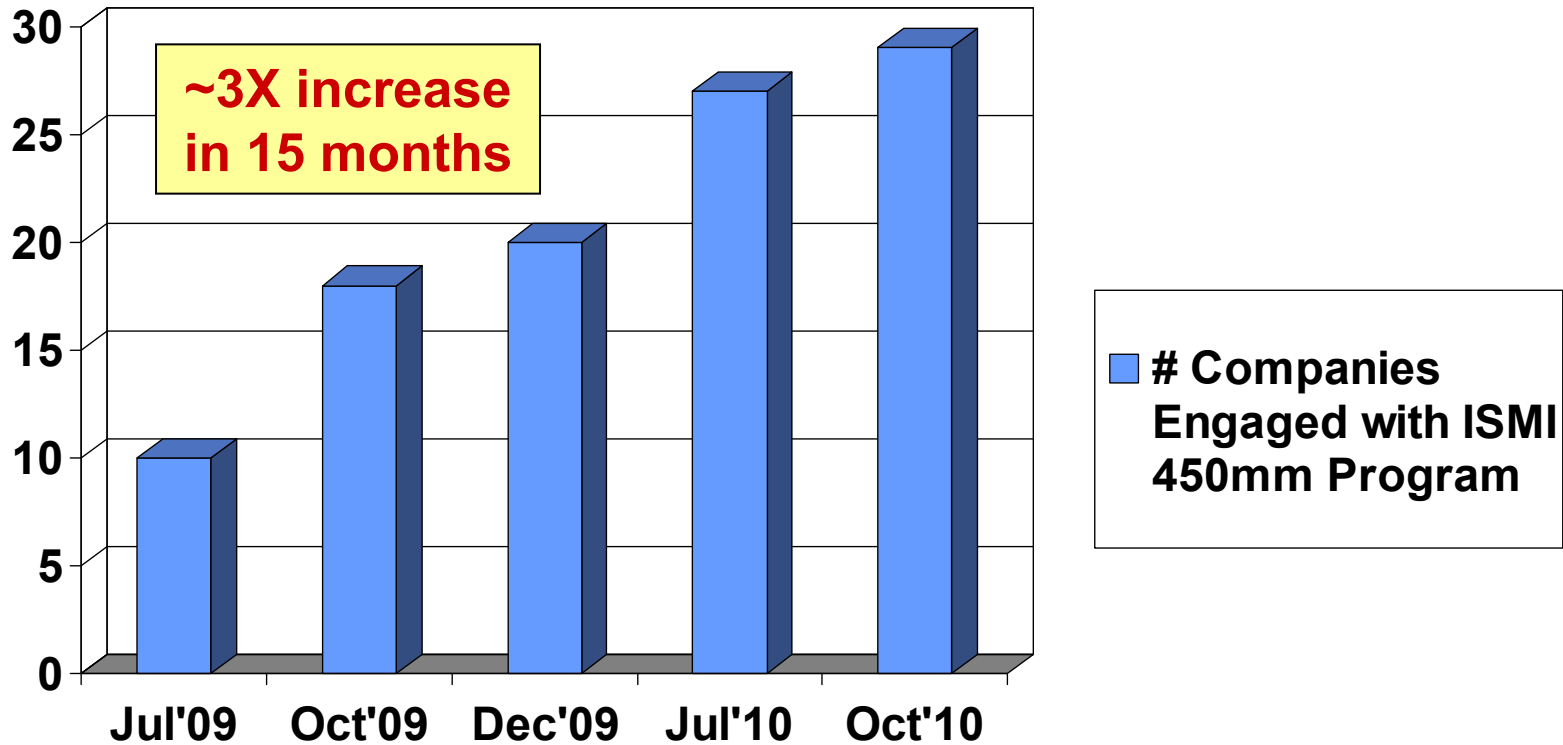
**450mm wafer handling
evaluations**

2008



**450mm cleanroom
announcement**

450mm Supplier Engagement



ISMI thanks all suppliers who have helped to realize 450mm progress to date.

* Engaged = providing equipment, materials, or services to ISMI 450mm Program

ISMI 450 mm program mission and organization



ISMI's 450 mm mission statement

- Enable a cost-effective 450 mm transition through coordination and development of infrastructure, guidance, and industry readiness

2010 ISMI 450 mm organization

450 mm transition program

Supplier engagement

Factory integration readiness

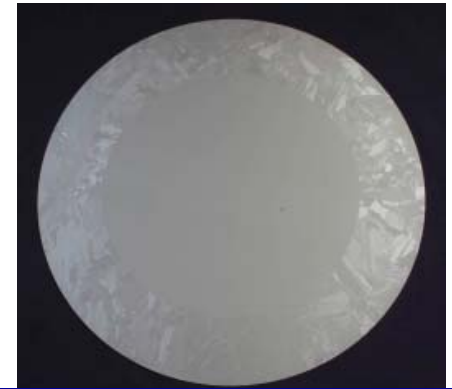
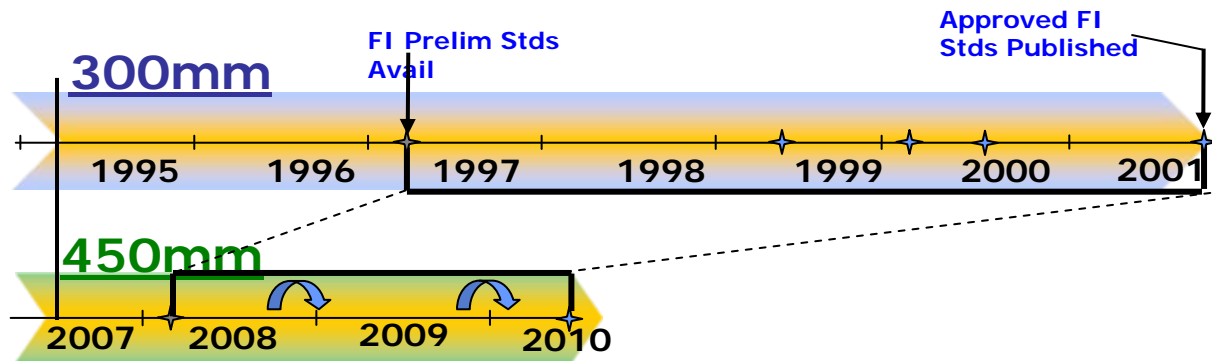
Test wafer operations

Starting materials

Vacuum platform development

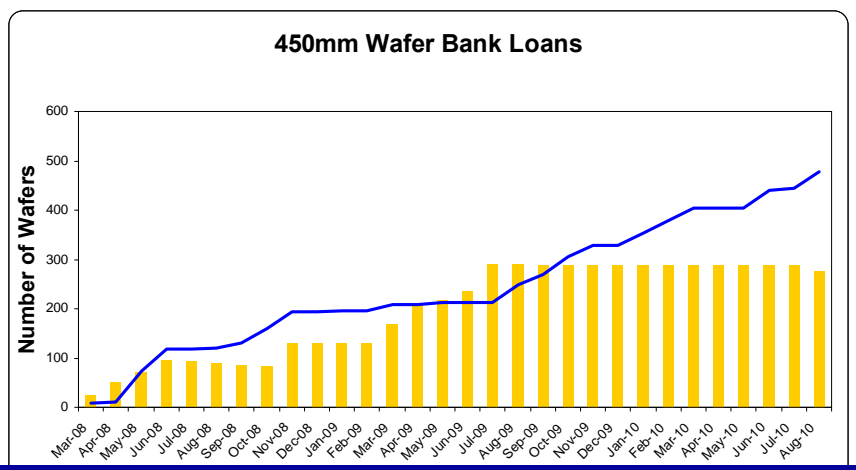
Equipment test methods and metrics

“Cost Effective Transition” – Examples



ISMI's Test Bed helps enable a 60% reduction in time to Standards v. 300mm

Sintered and Hybrid wafers reduce early development costs



Integrating metrology modules onto existing EFEMs reduced handling costs 50%

ISMI's Wafer Bank has loaned >500 wafers – at no cost to suppliers

ISMI 450mm Operations Increasing

Expansion and transition of ISMI to CNSE/Albany in 2011.

- \$20M from New York accelerates ISMI's 450mm program.
 - Increased supply of 450mm silicon
 - Increased equipment to generate additional 450mm test wafers
 - Factory infrastructure to support increased operational scope

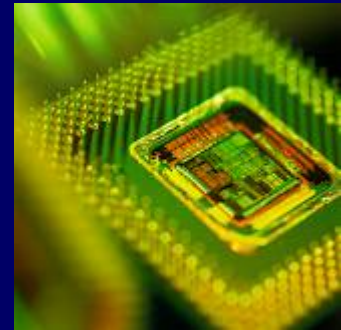


ISMI/CNSE Transition Announcement – 10/12 2010

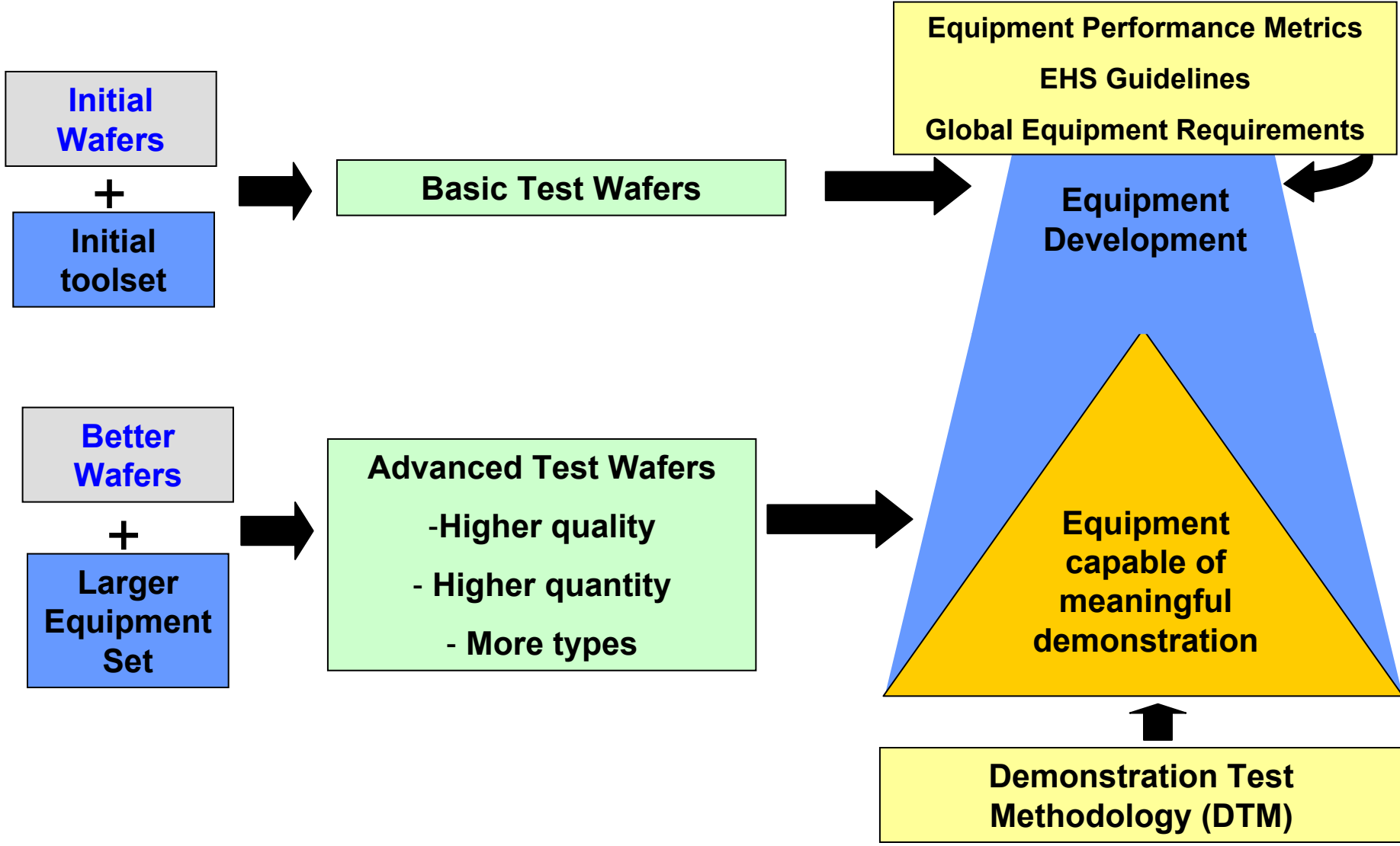


Accelerating Manufacturing Productivity

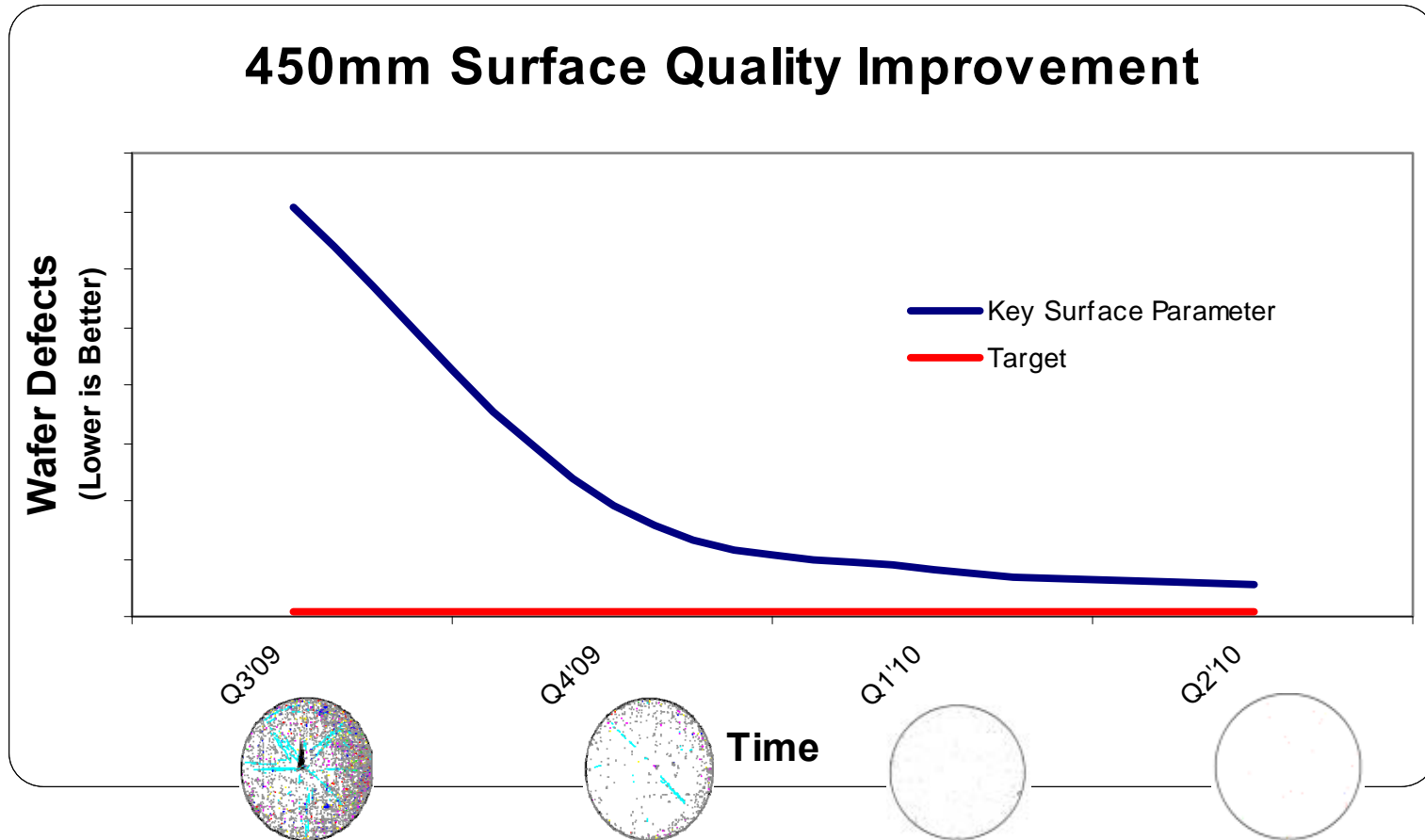
ISMI 450mm Development Strategy and Current Status



ISMI Equipment Development and Demonstration Strategy



450mm Wafer Quality Is Improving

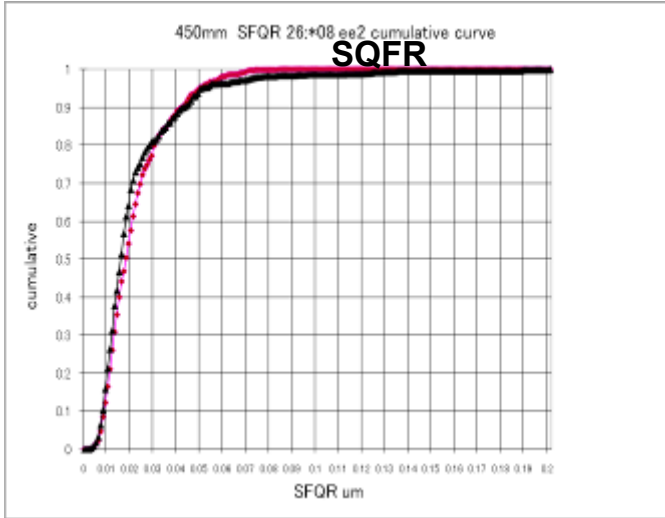


2009 - Polishing has been improved – scratches have been eliminated

2010 – Cleaning has been improved – particle levels have been reduced 10X

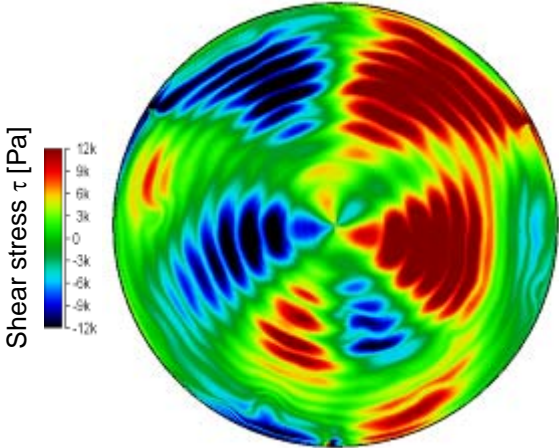
Wafer Quality Improvements, cont.

- Example of Recent Learnings



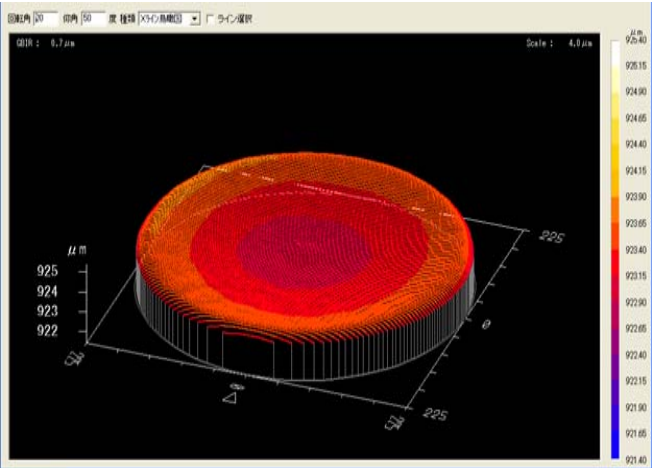
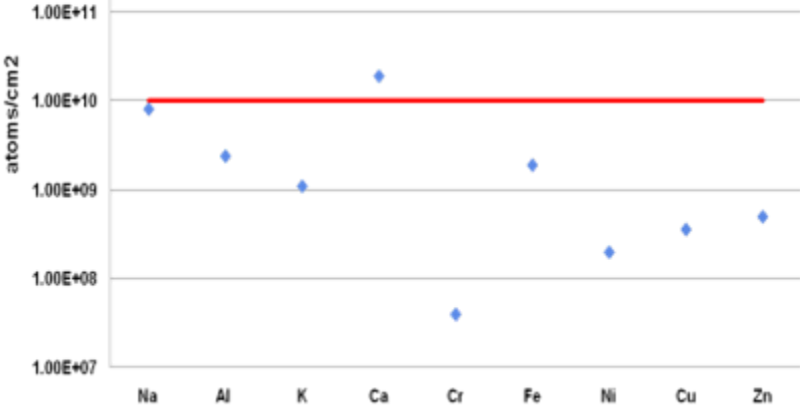
**Quality of 450mm
 crystal/wafer**
 >
**300mm quality at
 same development
 stage**

Stress Evaluation



GBIR

Surface metals as measured by VPD



ISMI's 450mm Cleanroom Operations



Lot Sorter



Wet Cleans



Ellipsometer



Particle Inspection / Wafer Edge Inspection

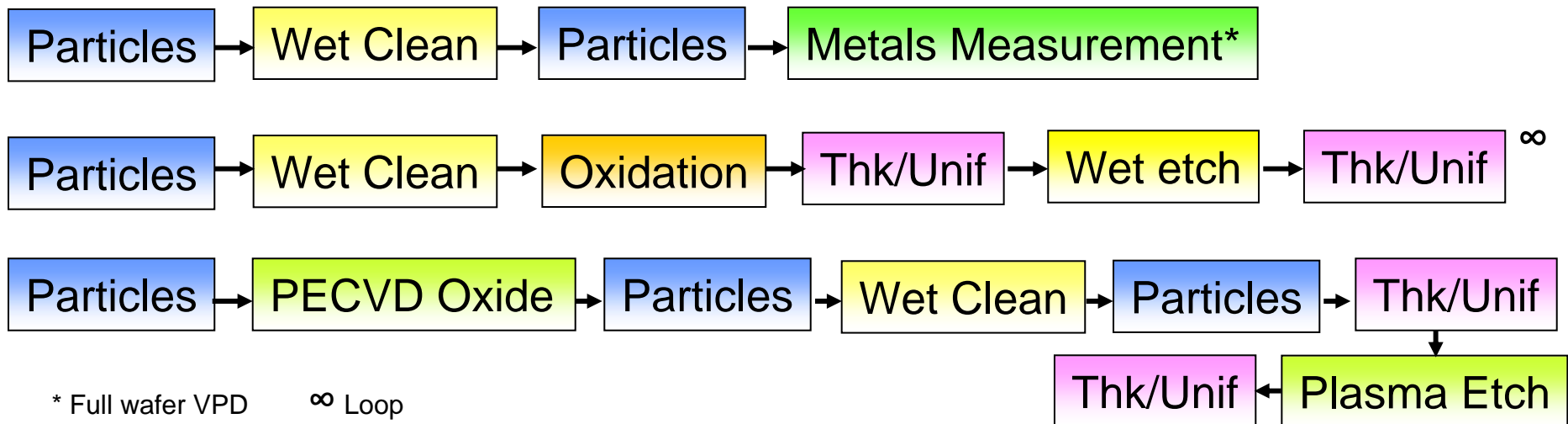


FOUP Washer (Nov. Install)

Building Test Wafer Infrastructure

- Q4'09: Initial 3 step process flows executed
- Q4'10: 7 step flows are presently in fabrication
 - Looped flows have been designed to accelerate tool development (Processing, measurement, processing, reclaim, etc.)

Example Test Wafer Flows



450mm Equipment Mainframes



450mm Mainframes Available Now

450mm AMHS

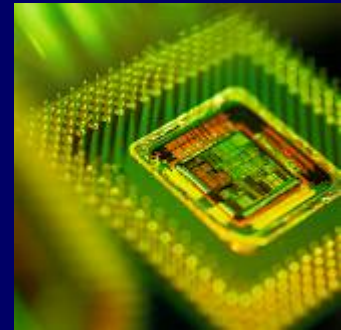
- Evaluation of 2 stockers and 1 OHT completed
- 300mm AMHS model scales to 450mm with no significant problems
- 450mm Carrier standards maturity is enabling suppliers' progress
- PGVs are demonstrated as ready for safe manual handling of 450mm carriers



450mm PGV

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Summary and Key Messages



Summary - 450mm readiness – October 2010



- Test wafer development has started for multiple process and metrology equipment.
- Supplier interest in development of equipment for test wafer generation and/or demonstration is increasing - in all geographies
- Silicon suppliers are positioned to provide additional quantities of 450mm wafers - with improved quality
 - ISMI's wafer loan program has provided >500 wafers for industry development
- SEMI Standards are completed for 450mm FOUPS and loadports, and 450mm Mechanical and Developmental grade wafers.
- Initial evaluations of AMHS prototype pilot lines are completed.
- 450mm equipment platforms are available now.

450mm Key Messages – October 2010



- ISMI continues to drive the activities required to enable the needs of its members towards the realization of a cost-effective 450mm transition.
- 450mm activity is increasing globally.
- ISMI expects to realize multiple new capabilities and increased wafer inventory in 2011.
- Challenges remain to realize a comprehensive 450mm infrastructure at advanced technology nodes.
- Wanted - constructive discussion with entities interested in contributing towards ISMI's 450mm transition goals.

For Further Information ...

<http://ismi.sematech.org/meetings/archives/450mm/>

-Or-

Tom Jefferson, ISMI 450mm Program Manager

tom.jefferson@ismi.sematech.org

THANK YOU !!!

Questions and Discussion



ISMI – Accelerating Manufacturing Productivity