

The Probe-Centric Future of Test

Jack Courtney – IBM
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ISMI Probe Council

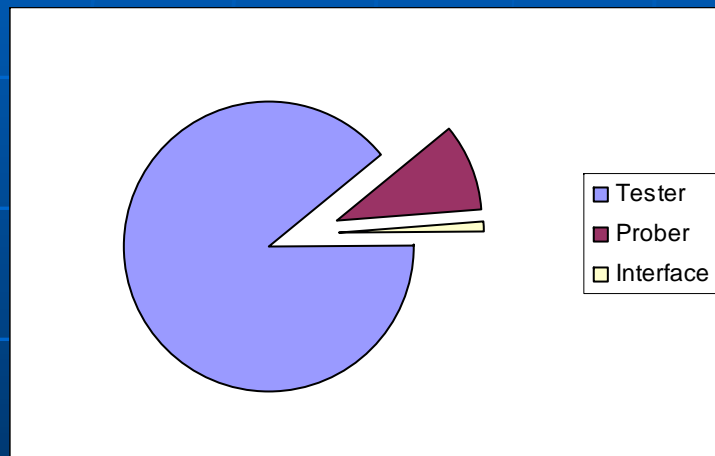


Grand Challenge – Probe Costs

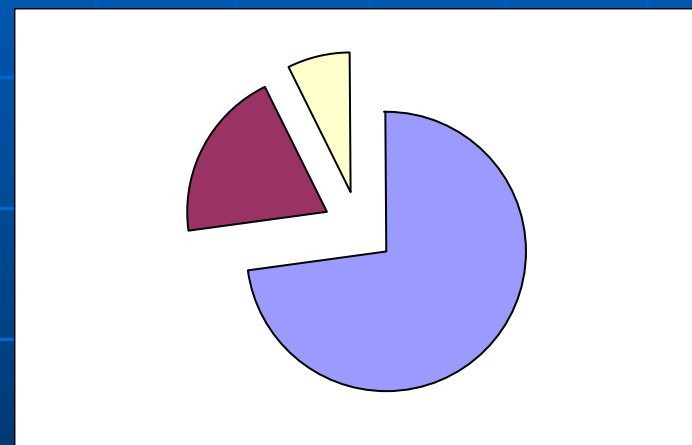
- ITRS Executive Summary – 2005 Edition
 - We made the 'front page'
 - "non-scaling of test costs such as tooling (eg. probe cards) are threatening to dominate the cost of test"
- Test Section – more detailed discussion
 - Multiple factors driving probe costs
 - Higher speed and fidelity
 - Multi dut – key to controlling test costs "as long as the interface costs don't defeat the purpose..."
 - Higher signal and power pin counts
 - Increased Power

Bigger Piece of the Pie

Initial Capital Investment – (John Harris-BiTS Keynote 2006)



Year 2000
Total Cost = ~\$3.5M

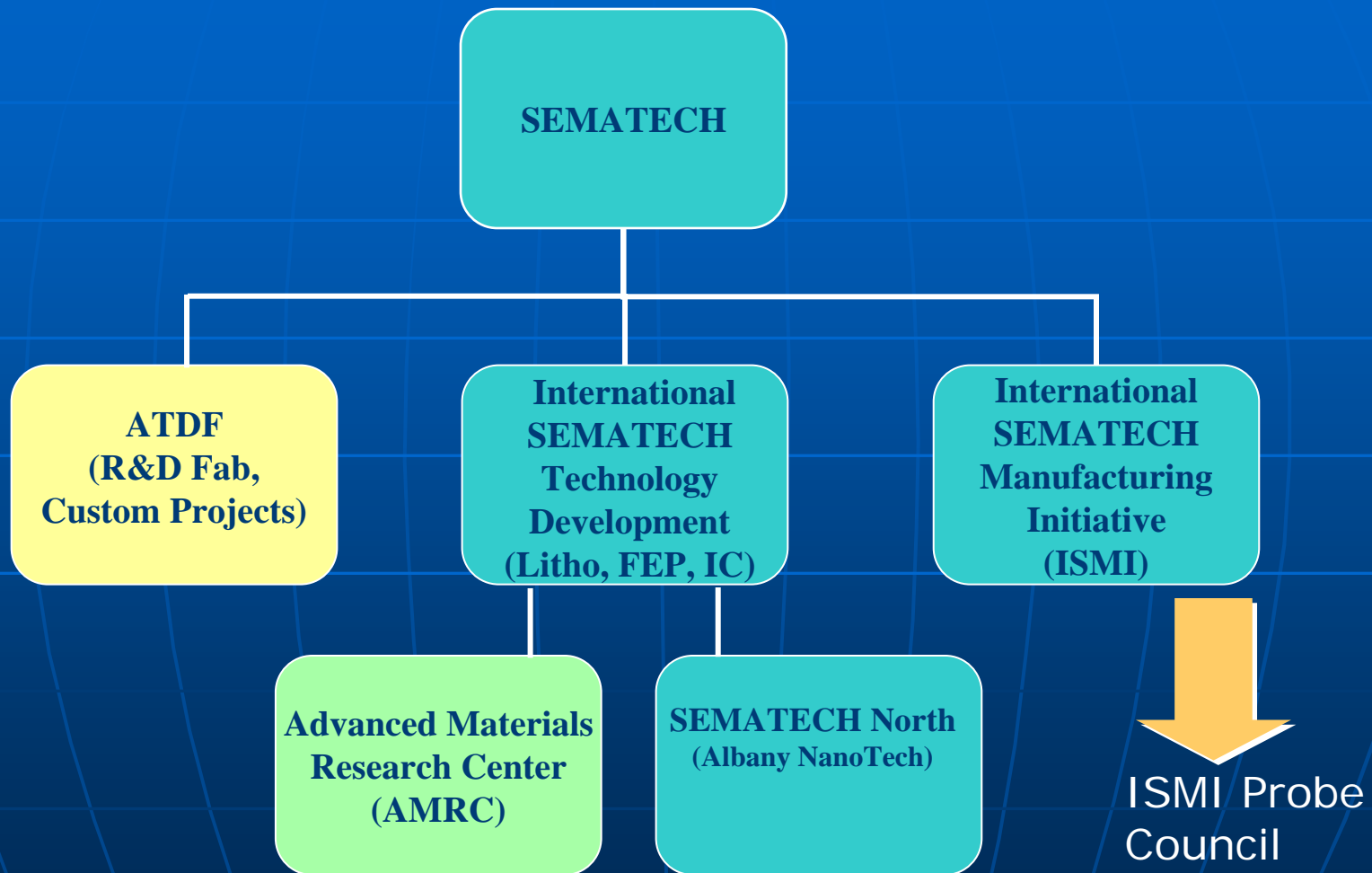


Year 2005
Total Cost = ~\$1.7M

Drivers clear in roadmap data

- Probe Count Increasing
 - Multi-DUT
 - Hi Power
 - More i/o
- Pad Pitch Shrinking
 - Both wire bond and bump
- Power and Performance

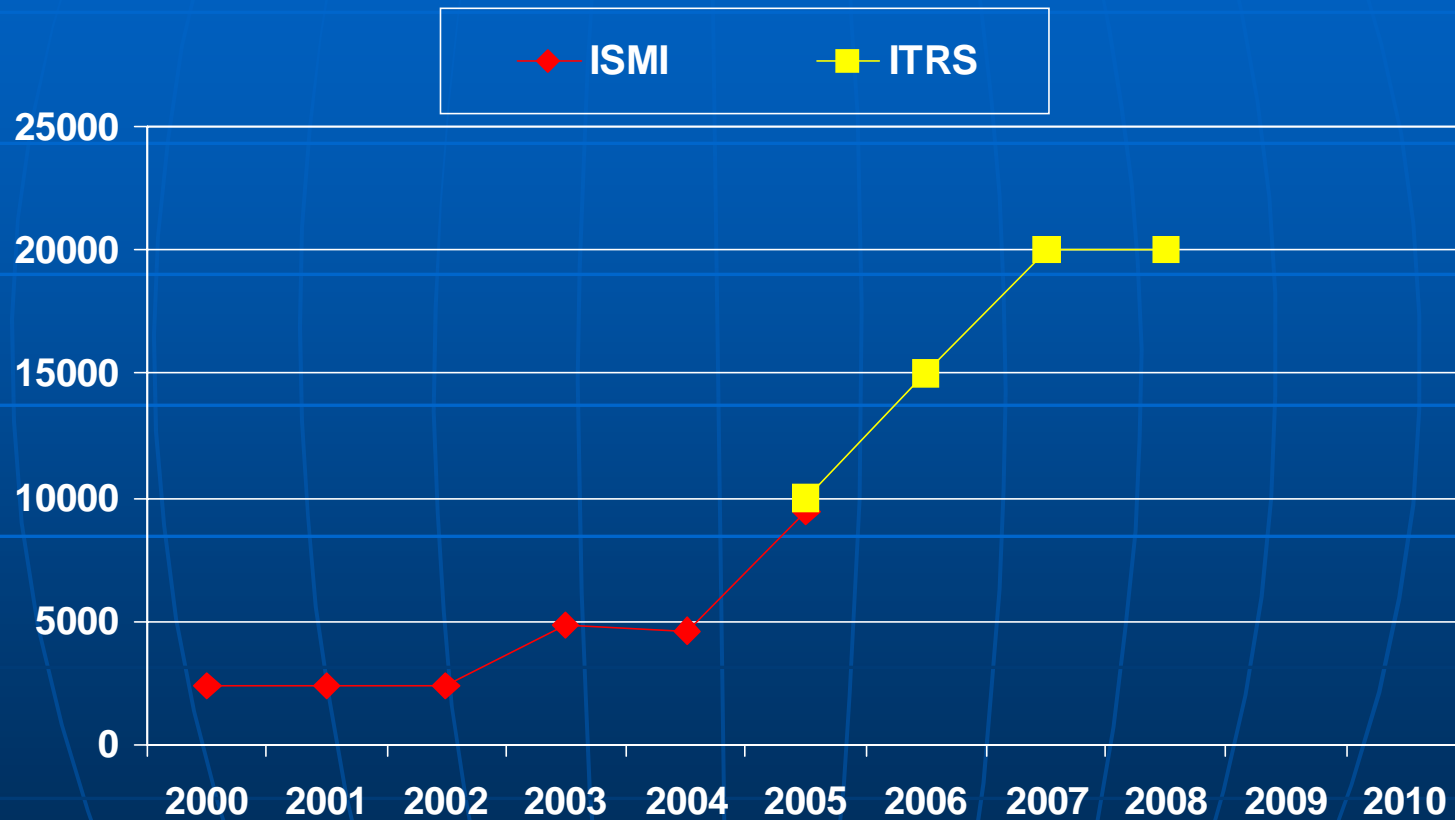
The SEMATECH Consortium



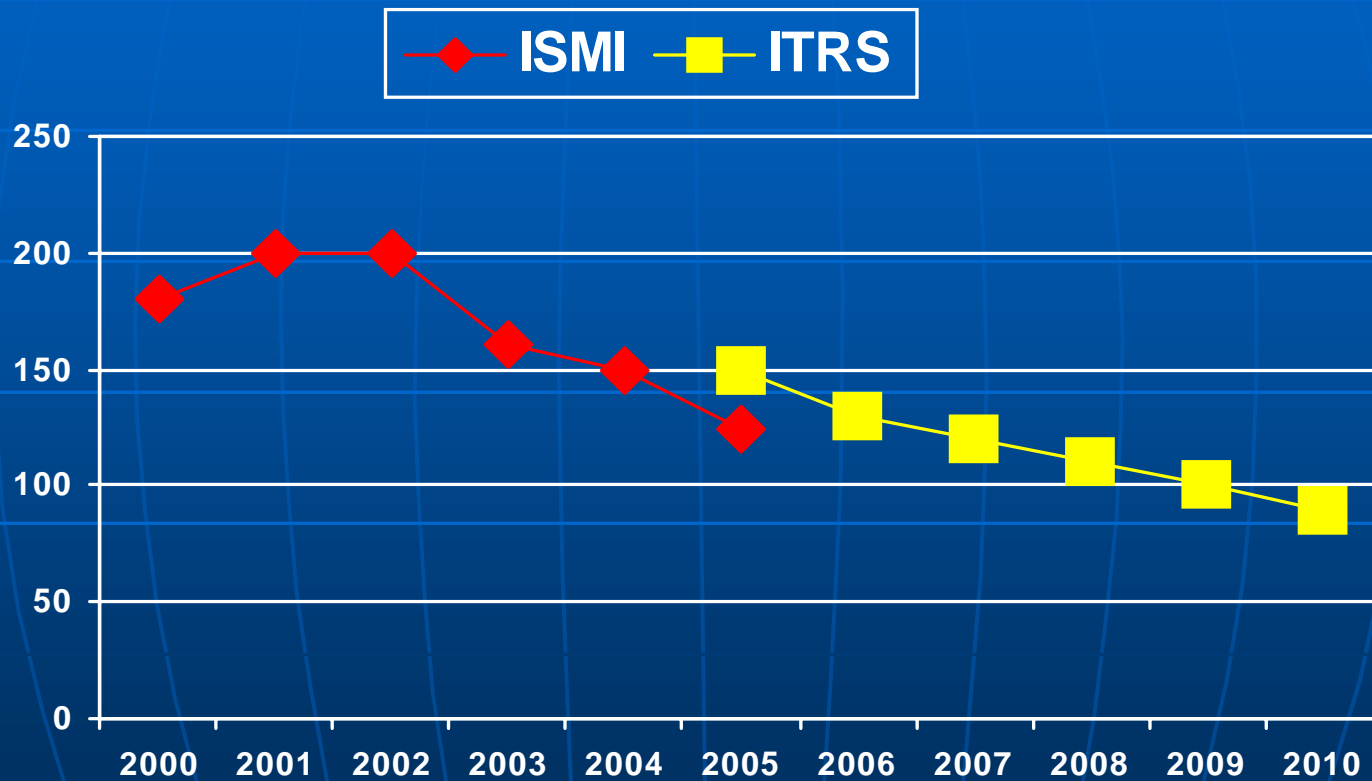
ISMI Probe Council

- Member companies participating
 - AMD, Freescale, IBM, Infineon, Intel, Phillips, Spansion, TSMC, TI
 - Activities
 - Quarterly Meetings
 - Probe Metrics Survey
 - Probe Card Supplier Survey
 - Roadmap
 - Standards – Current, Probe heads, RF ID
 - COO Model
 - Test Site Wafers

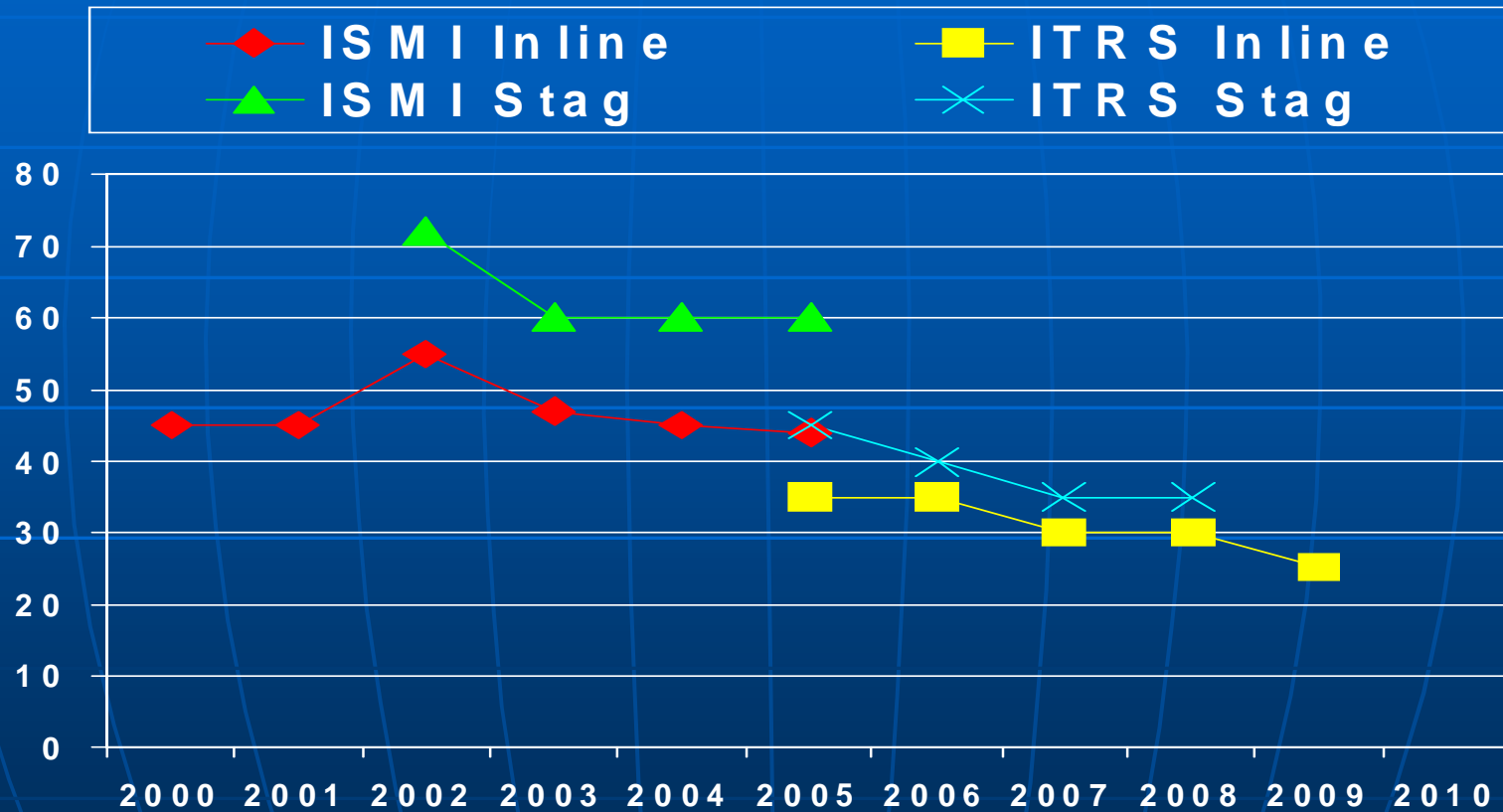
Probe Count is RRRising



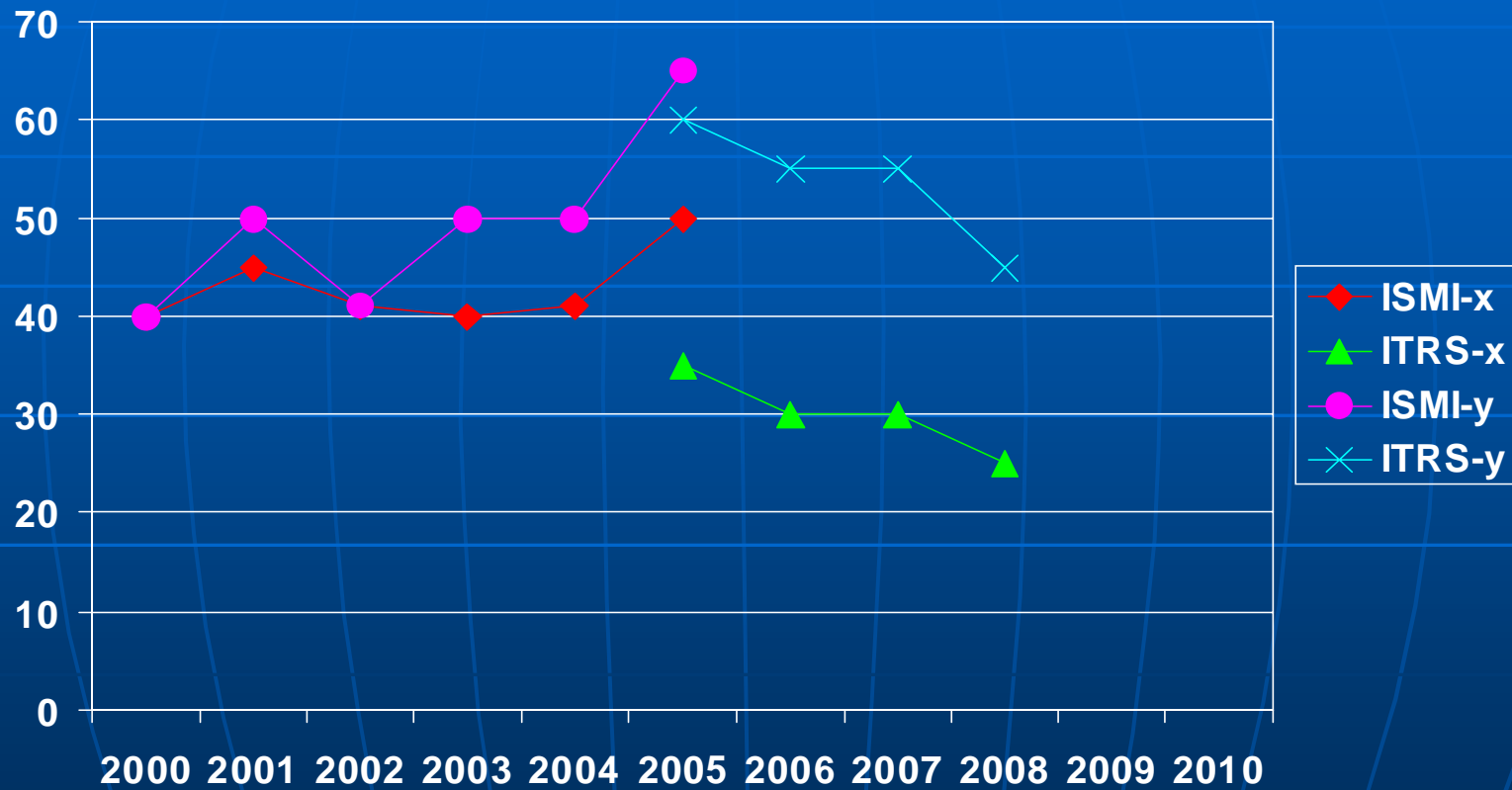
Bump Pitch is Shrinking



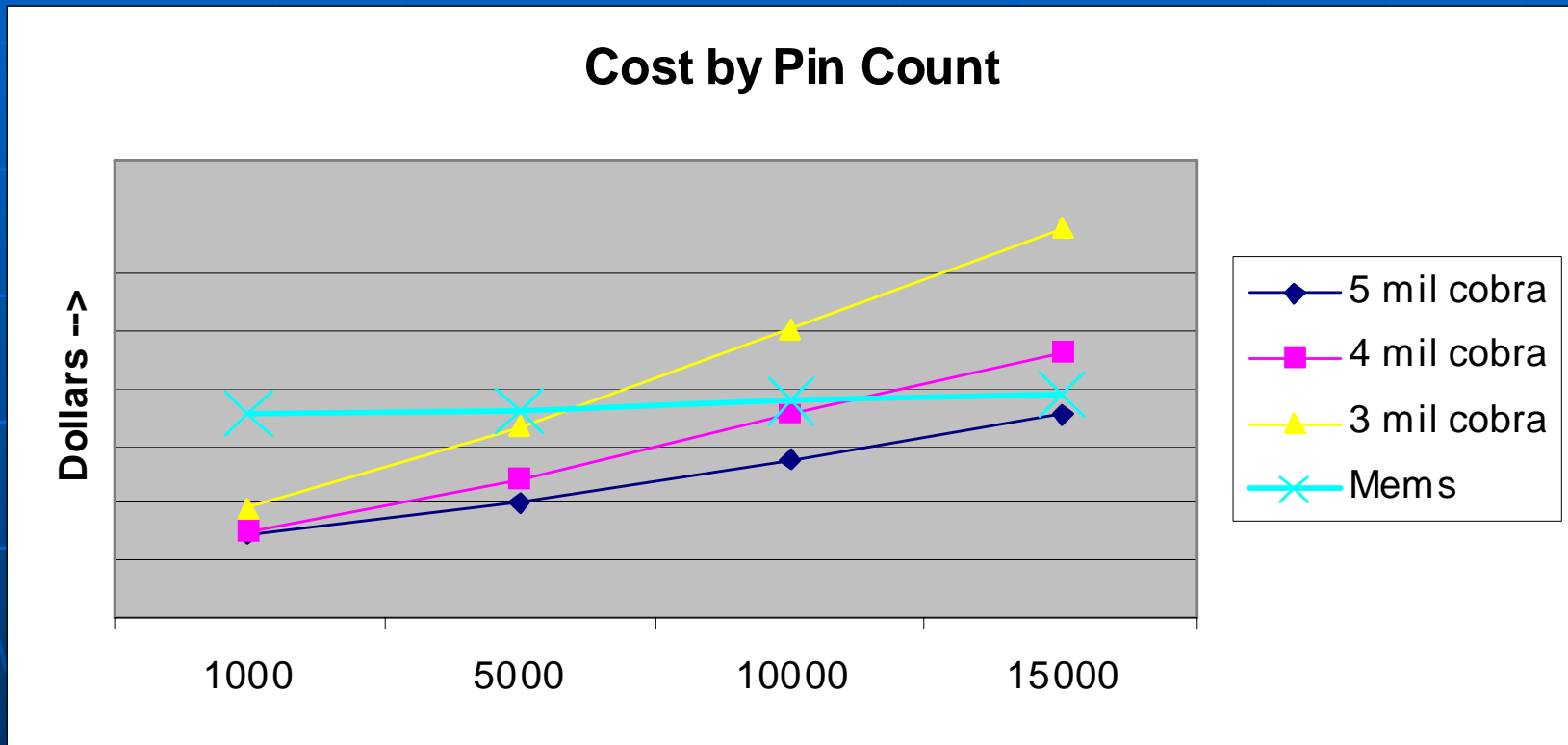
Wire bond pitch is decreasing



Pad Size Anomaly



Impact of Pin Counts and Pitch



Other Trends

- Plus trends for
 - Power – 500 watts and growing
 - CRES – 5 ohms -> 1.0 -> 0.5
 - Multi-DUT – 50% growing to 75%
 - Production resources – more probe people in repair, engineering & development.

Probe Metrology

- As Probe Costs Rise – Metrology becomes a focal point
- Tracking
- Metrology Tools – Analyzers
 - More, faster, higher pin count
- Maintenance
- Cleaning

Summary

- The light is shining on the probe world
- A key to controlling test costs will be our ability to innovate and reduce costs of probe cards
- It's a PC future ahead of us.
- Interesting times ahead...