

MEMSLand

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Cost Effective MEMS to Develop a Sustainable High Tech Business



Point-One

Pole of innovative technology on nanoelectronics and embedded systems

Clocks are the heart of every electronic device



Digital Still Cameras
3 to 4 timing devices



Digital TV
4 to 7 timing devices



DVD Recorder
2 to 4 timing devices



Laptop and Desktop
4 to 10 timing devices



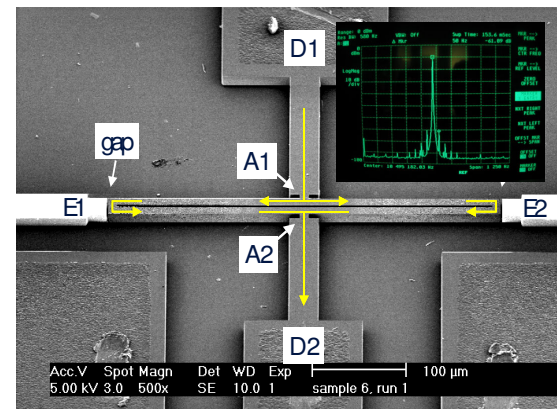
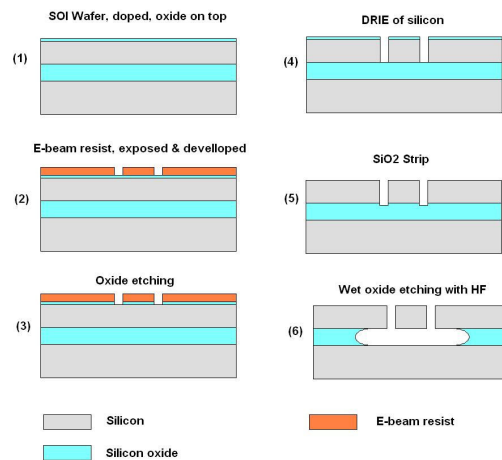
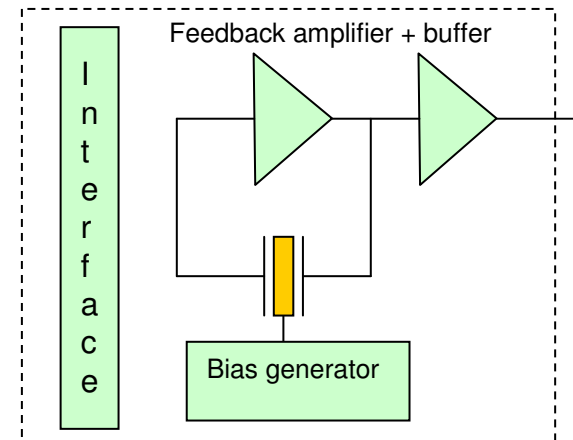
Video Camera
4 to 6 timing devices



Gaming
3 to 6 timing devices

MEMS XO Description

- MEMS oscillator is a MEMS resonators with surrounding electronics for a stable system
- MEMS resonator is processed in 1.5 μm SOI which enables monolithic integration with active circuitry



Technical Progress Summary

- SOI MEMS tape outs:
 - Jan 07: VibrantiN1 1st batch (IMEC) started
 - Mar 07: VibrantiN1 uncapped device wafers available
 - May 07: VibrantiN2 masks ordered
- Result: working devices but Q-factors disappointing.
- Demonstrators of 26MHz/52MHz oscillators planned for end 2007
- Industrial Process Flow design start in Nijmegen planned April 2008

MEMS XO Roles

- NXP: design, modeling, process integration, testing, industrialization
- TUE: resonator design and modeling
 - SAI-DTI PhD: resonator design
 - SAI-DTI 2-TWAIO: micro-cavity pressure sensing
 - SAI-ICT 2-TWAIO: oscillator circuit 52MHz
- Bruco: system circuit studies
- Univ. Twente: oscillator design (to start when student is available)

More MEMS in thin SOI

	Low End	Mid End	High End
MEMS Oscillator	PLL based frequency synthesizer		GSM low noise oscillator
Accelerometer	1-axis, high g (airbag)	2/3-axis, 8 to 10 bit, (handheld applications)	Low g, 12 bit, 3 axis
Other		Active tilt sensing	Gyroscopes

MSTnews (Feb2007) : Accelerometer industry roadmap

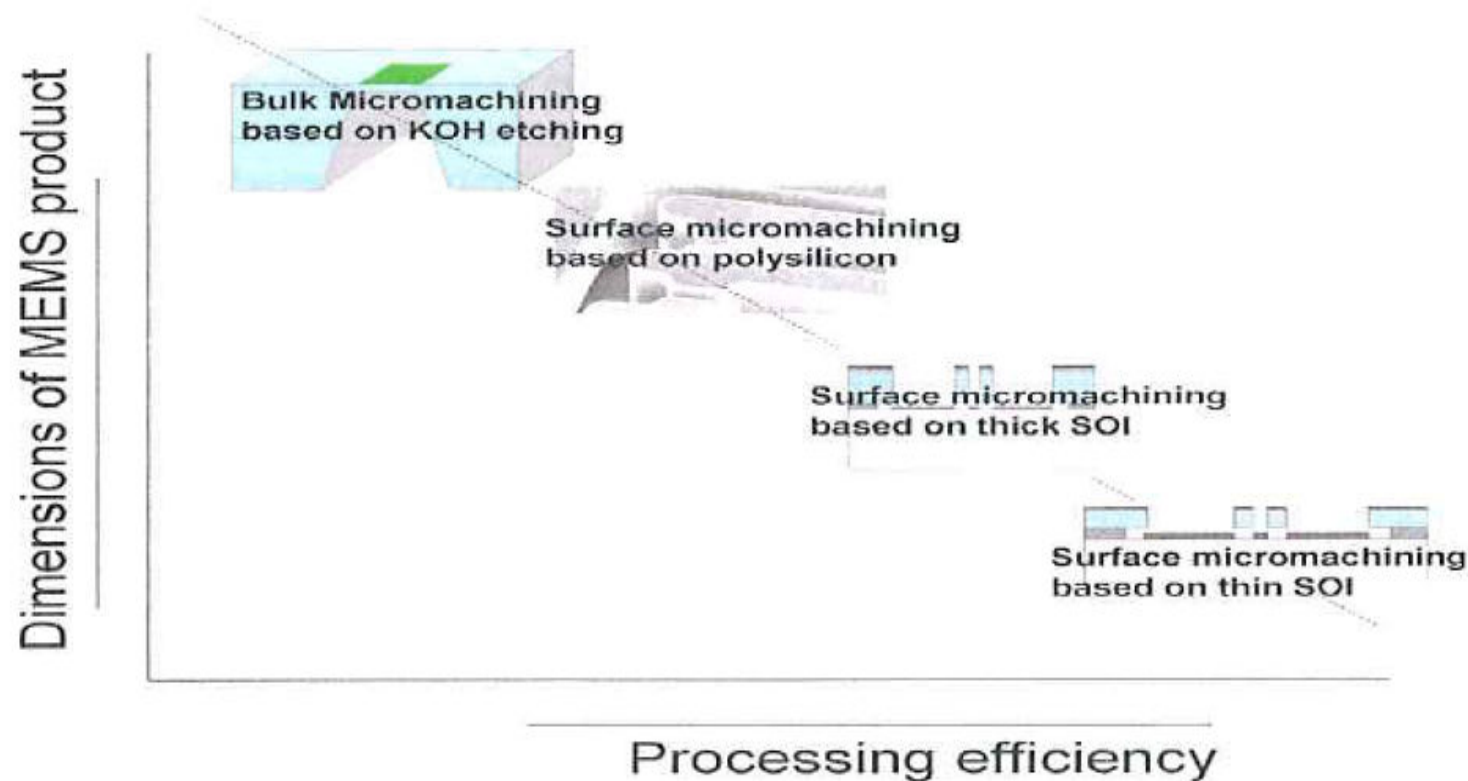


Figure 5: Evolution of processing technologies
(Source: enablingMNT)

Accelerometer industry roadmap (2)

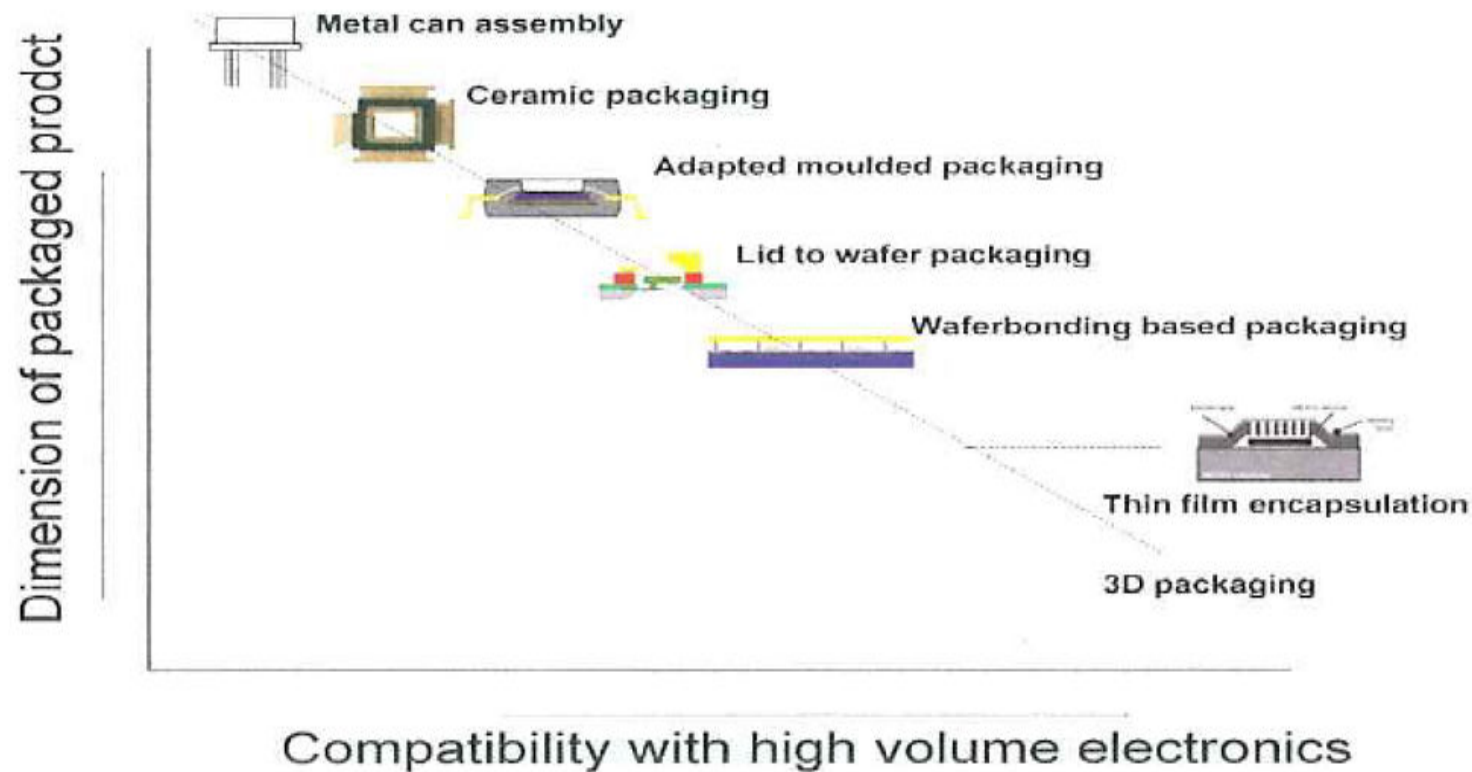


Figure 6: Integration roadmap (Source: enablingMNT)

Accelerometer industry roadmap (3)

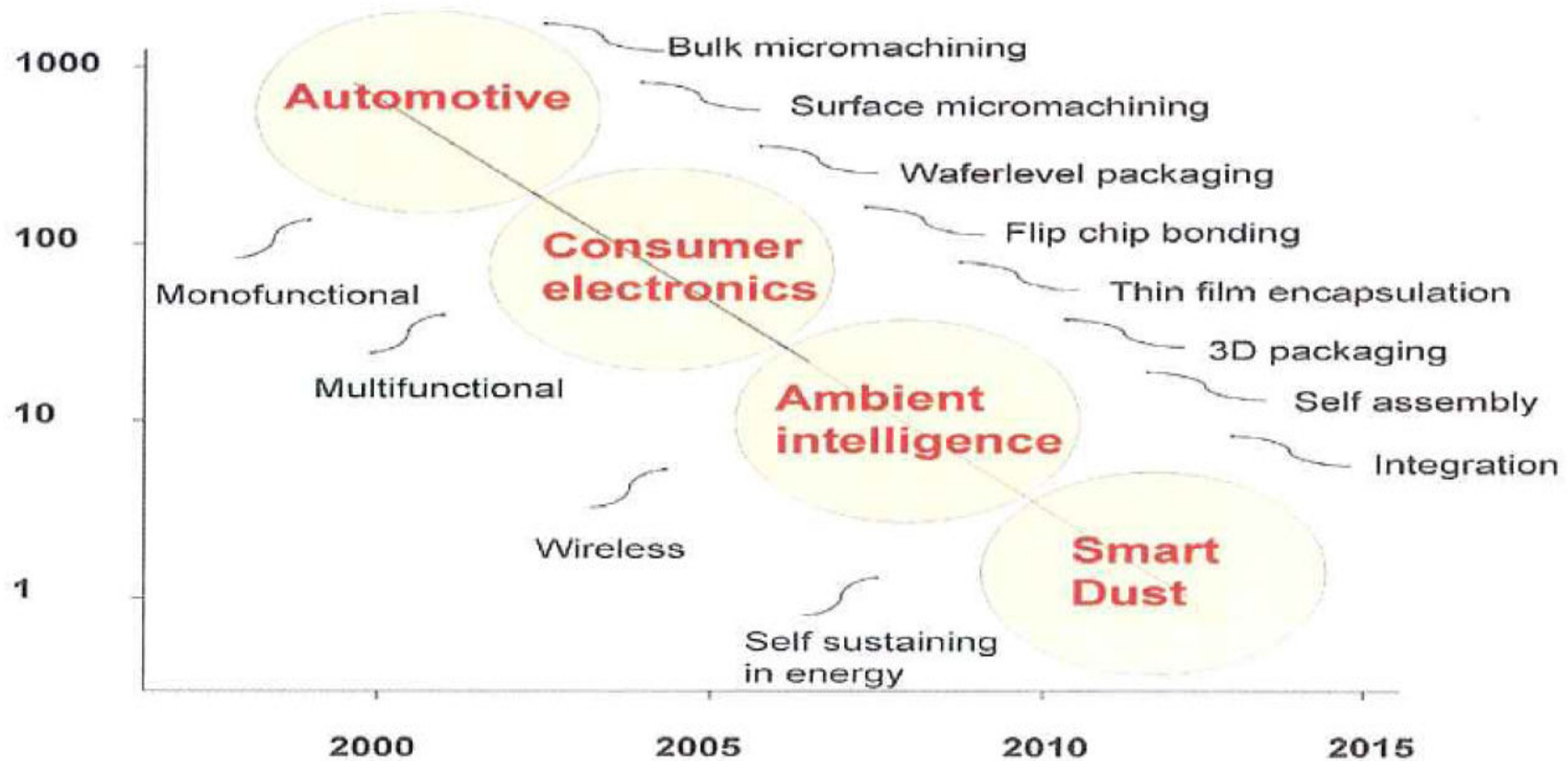


Figure 8: Technology and markets roadmap (Source: enablingMNT)