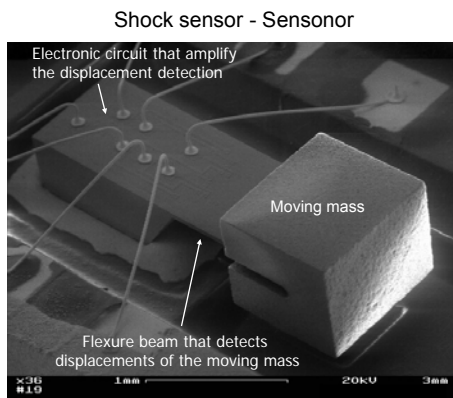




« Design for Reliability and Test of Microsystems »

April 2006

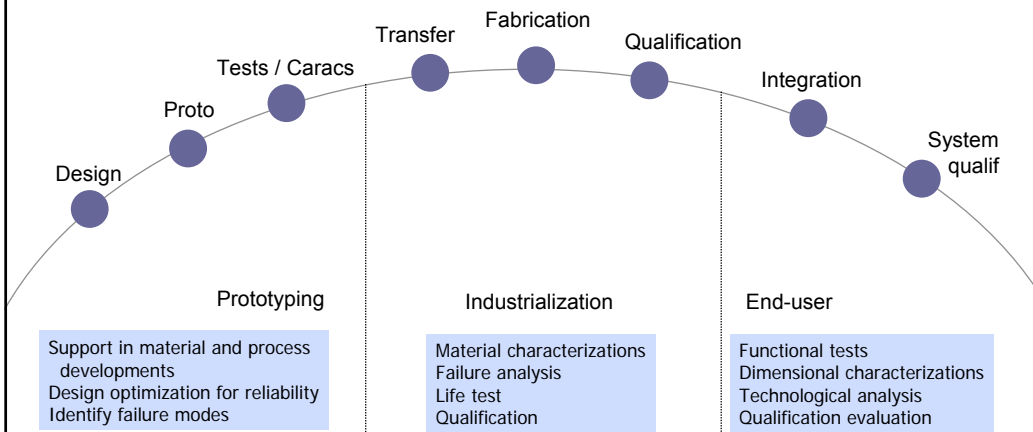
Why quality assurance of multi-physic micro and nano devices?



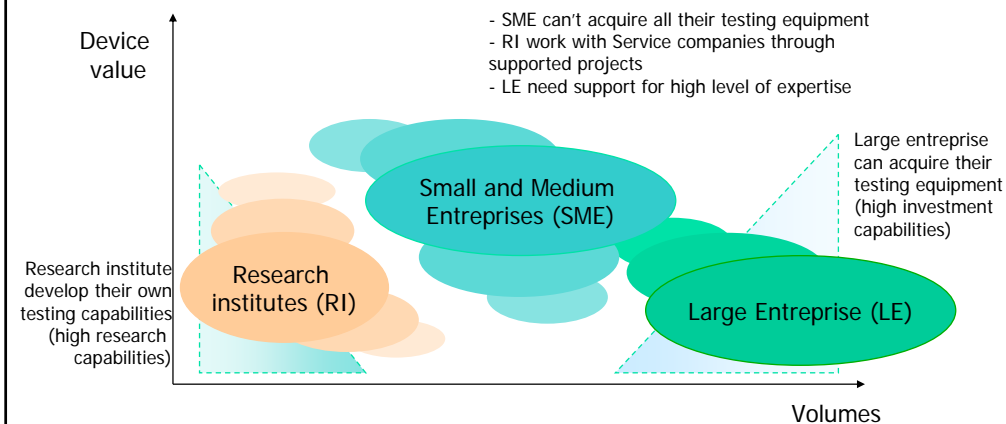
- ▶ Because micro and nano technologies involves moving mechanical parts
- ▶ They are exposed to new failure modes (sticking, fatigue, cracks...)
- ▶ Reliability assessment need to couple several physical domain (mechanical, electrical, optical, fluidic, barometric...)
- ▶ Changing scale make them difficult to observe and characterize
- ▶ *Close to the atomic scale, the physic changes (Van de Walls forces, stiction due to humidity, local charging,...)*

NOVA MEMS is one of the first company specialized in quality assurance issues of integrated systems

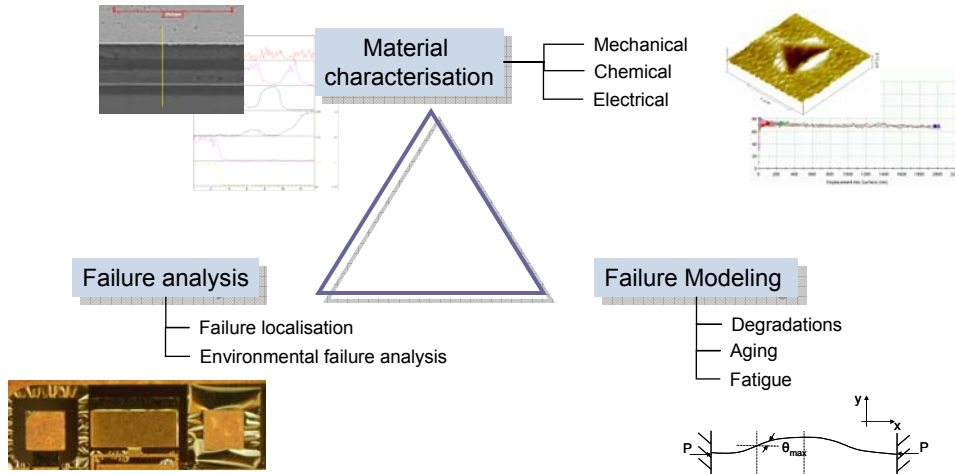
Where?



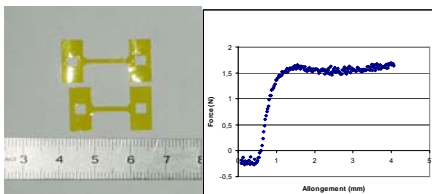
Market needs



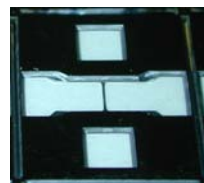
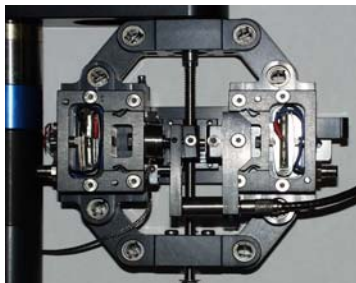
Reliability assessment method



Microcharacterisation



(a) Kapton probe (12 μ m thick),
Before and after pulling
(b) Force vs Lengthening



Silicon test structure

Courtesy M. Ignat (LTPCM)
& AUXITROL & LPM-INSA

Dynamical characterizations



► SOI resonator

- Extraction of resonant frequencies
- Inplane / Out of plane displacement
- Studies versus temperature, pressure, vacuum
- Aging studies

